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THESIS



EVOLUTION OF A GRAPHICAL USER INTERFACE FOR THE RAPID PROTOTYPING OF REAL-TIME EMBEDDED SYSTEMS

by

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September 1997

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EVOLUTION OF A GRAPHICAL USER INTERFACE FOR THE RAPID PROTOTYPING OF REAL-TIME EMBEDDED SYSTEMS

Kenneth Brett Moeller B.S., University of California at San Diego, 1983

Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

The Computer-Aided Prototyping System (CAPS) is an integrated collection of software tools that support the development of software systems utilizing the prototype paradigm. Central to CAPS is the Prototype System Description Language (PSDL). The PSDL Editor supplied in CAPS Release 1 provided a unique combination of a graphical interface for editing PSDL data flow diagrams and an attribute-grammar based text editor to enforce syntactically correct PSDL prototypes. Feedback from CAPS users highlighted on productivity impacts due to the dual user interface as well as the steep learning curve required to become proficient with the attribute-grammar based text editor.

This research initiates the development of the next generation of the CAPS PSDL Editor, focusing on the graph editor. Our approach provides a single graphical user interface with pull-down menus for editing both graphical and text information. Automatic syntax generation and validation as well as limited semantic validation is provided by a background syntax/semantics checker. The result of this research is a working graph editor meeting all the new requirements. When integrated with a the new syntax/semantics checker, CAPS Release 2 will have a PSDL Editor with enhanced capabilities and expected productivity improvements.

DISCLAIMER

The computer programs provided in the appendices are supplied on an "as is" basis, with no warrantees of any kind. The author bears no responsibility for any consequences of using these program.

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I. INTRODUCTION

A. BACKGROUND

The Computer-Aided Prototyping System (CAPS) [Ref. 1] is an integrated collection of software tools that support the development of software systems using the prototyping paradigm. The focus of CAPS is the development of hard real-time embedded software systems [Ref. 2]. Through the use of the prototyping paradigm, CAPS is especially well suited to support the development and validation of system requirements as well as feasibility studies [Ref. 3].

The software tools that comprise CAPS are organized into four major subsystems: Editors, Software Base, Execution Support, and Project Control (see Figure 1) [Ref. 4]. Underlying each of these subsystems is the Prototype System Description Language (PSDL) [Ref. 3].

Prototypes developed in CAPS are specified using PSDL PSDL is a highlevel language, rich in abstraction and with facilities for capturing the requirements

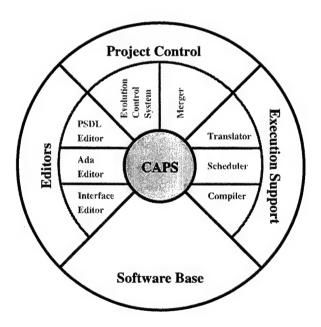


Figure 1. CAPS Subsystems, After [Ref. 4]

of real-time systems. In PSDL, a prototype is partially specified as an augmented data flow diagram. A representation of a PSDL prototype is provided in Figure 2. The augmented data flow diagram is depicted by the shaded box at the top of the figure.

A data flow diagram consists of a network of operators which communicate through data streams. The data flow diagram depicted in Figure 2 is composed of three operators (represented as circles) and two data streams (represented as the directed-lines connecting the circles within the shaded box). The data flow diagram is augmented with timing and control constraints. In Figure 2, each operator is assigned a Maximum Execution Time (MET), which can be found at the bottom-right of each operator. In this example, all MET values are in milliseconds (ms).

A data flow diagram is one element of a PSDL component. PSDL provides two kinds of components: abstract state machines and abstract data types. An augmented data flow diagram is a visual abstraction of the processing to be performed by an operator. Operators are introduced through PSDL components. An abstract state machine specifies a single operator. Multiple operators can be introduced as part of an abstract data type. The prototype itself is implemented as an operator defined by an abstract state machine. There are two parts to each component: a specification and an implementation. The specification defines the component's interface. The component's implementation can be realized by either decomposing the component into a more detailed data flow diagram or by a reference to a programming language implementation. Figure 2 depicts the top level data flow diagram of a robot prototype. In this example, each operator has been implemented with a reference to a programming language implementation, illustrated by the three boxes below the augmented data flow diagram. The current release of CAPS supports two programming language implementations. An operator can be implemented as an Ada package or as a TAE module, providing a graphical interface. [Ref. 5]

The Editor subsystem provides a collection of editors which are tailored to the

PSDL Data Flow Diagram

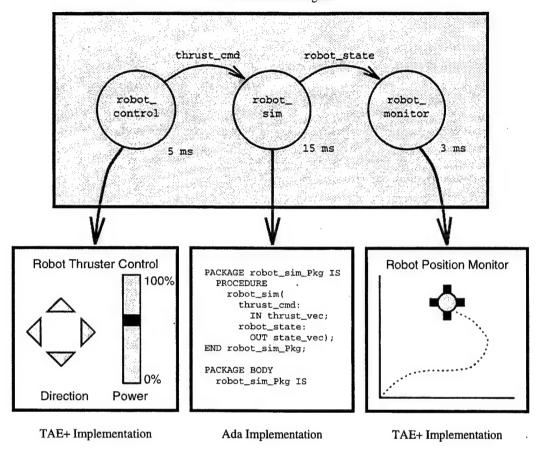


Figure 2. PSDL Data Flow Diagram and Implementation

ingredients of a CAPS prototype. The primary CAPS editor is the PSDL Editor. This editor is unique to CAPS and has been designed specifically for the development of PSDL prototypes. A graphical interface to support the data flow diagram as well as syntax generation and checking facilitate improved user efficiency in prototype development. Other editors are provided to edit the Ada packages and the TAE graphical interfaces which realize the prototype.

The Software Base subsystem provides CAPS with a repository of reusable prototype components. Facilities are provided to browse as well as query the component repository. Queries can be performed using the PSDL component specification.

[Ref. 6]

The Execution Support subsystem is one of the key features of CAPS which allows for rapid prototyping of real-time systems. The Execution Support subsystem provides for the automatic generation of "supervisory" code based on the PSDL specification of the prototype. The "supervisory" code provides scheduling of time critical and non-time critical operators, implements buffered communication paths (e.g., data streams) with applicable initial values, implements the control constraints specified in the prototype, and provides support for timers and exception handling. All of which is automatically implemented by CAPS.

The Project Control subsystem provides advanced project capabilities. The Evolution Control System facilitates prototype development in a team environment. The CAPS Merger provides an automated tool for change-merging of PSDL components. [Ref. 6]

CAPS has been an ongoing research area at the Naval Postgraduate School (NPS) for nearly ten years. During this time, CAPS has been used to develop a variety of student projects and theses, including an autopilot system, a cruise missile guidance system, and a Communications, Command and Control Information warfare (C3I) system. The current version of CAPS is Release 1. [Ref. 7]

B. CAPS RELEASE 1 PSDL EDITOR

The PSDL Editor provided in CAPS Release 1 facilitated the full specification of a prototype in PSDL (refer to Appendix A for the definition of the PSDL grammar). Departing from typical editors, the PSDL Editor provided facilities to view and edit the PSDL augmented data flow diagram in its most natural form, a graph (this functionality will be referred to as the "graph editor" in this document). However, the graph editor was limited in its capabilities to fully specify a prototype. The graph editor provided for the entry of the PSDL data flow diagram along with associated labels (i.e., operator and data stream names). In order to maintain a sim-

ple abstraction of the processing to be performed, the PSDL properties¹ displayed on the augmented data flow diagram were limited to those deemed most critical. For operators, the MET was supported. For data streams, the graph editor provided for the selection between a data stream and a state stream as well as for any stream latency. The remainder of the PSDL specification was supported through the use of a text editor.

Once again, the CAPS designers departed from typical editors with the inclusion of a syntax-directed editor to facilitate the required text editing. A syntax-directed editor is a language-based editor. With knowledge of a language's syntax, a syntax-directed editor is capable of detecting and locating syntax errors. For CAPS, this means that PSDL syntax errors can be corrected in the editor rather than waiting for them to be detected by the Execution Support subsystem. In addition, a syntax-directed editor can provide the user with templates for structures within the language. The syntax-directed editor provided in CAPS Release 1 was implemented using the Synthesizer Generator, a commercial product developed by Thomas Reps and Tim Teitelbaum [Ref. 8].

Provided with a definition of a language's abstract syntax, context-sensitive relationships, display format, concrete input syntax, and transformation rules, the Synthesizer Generator produces a language-based editor. Fundamental to the operation of the Synthesizer Generator is the use of an attribute grammar. An attribute grammar is obtained by the addition of attributes to the nonterminal symbols of a context-free grammar along with a set of attribute equations. As an object is edited with a syntax-directed editor (created by the Synthesizer Generator), the object is represented internally by a derivation tree, which is based on the attribute grammar. It is the derivation tree which is traversed and modified through editing operations. [Ref. 8]

¹PSDL properties will be discussed in Chapter II. For the present, the MET and the Latency are timing requirements of the prototype. A state stream is a special case of a data stream which provides the prototype with memory.

In the CAPS Release 1 PSDL Editor, the graph editor and the syntax-directed editor were merged together to provide an integrated tool to facilitate the development of prototypes. The PSDL Editor was implemented by executing the syntax-directed editor and the graph editor in separate processes. The syntax-directed editor was the parent process. Two copies of the graph editor were executed, each in its own process. Upon startup of the syntax-directed editor, the first copy of the graph editor was created as a graph viewer. As the PSDL prototype was traversed in the syntax-directed editor, the graph viewer displayed the applicable data flow diagram. In order to edit the data flow diagram, a second copy of the graph editor was created as a graph editor.

The implementation of the CAPS Release 1 PSDL Editor resulted in the creation of an artificial boundary between the data flow diagram and the associated PSDL properties. This artificial boundary resulted in a two step process of prototype development for the typical CAPS user. In this process, the user would create the data flow diagram of the prototype using the graph editor (reference Figure 3²). When the data flow diagram was reasonably complete, the user would return to the syntax-directed editor (reference Figure 4), where the associated properties would be entered.

The separation between the syntax-directed editor and the graph editor fostered a single mind-set of operation in which all of the data flow diagram was entered prior to the use of the syntax-directed editor to enter the associated properties. State streams presented a large potential for error. If a user specified a state stream in the data flow diagram through the graph editor, the state stream was not implemented until the user again specified the state stream in the syntax-directed editor.

The templates available in the syntax-directed editor provided assistance to the user in developing a syntactically correct prototype. At each stage of a prototype's development, the syntax-directed editor was capable of prompting the user for the

²This prototype is taken from the avionics_example found in Appendix B.

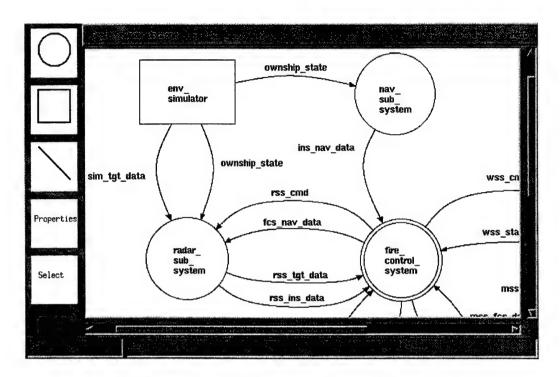


Figure 3. CAPS Release 1 Graph Editor

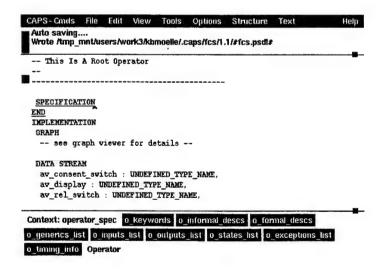


Figure 4. CAPS Release 1 Syntax-Directed Editor

legal alternatives within the PSDL grammar (refer to the bottom of Figure 4). In addition, the knowledge of templates enabled the syntax-directed editor to perform operations on entire structures, made available to the user from the Structure menu (refer to the top of Figure 4).

However, due to differences between the attribute grammar programmed into the syntax-directed editor and the PSDL grammar definition (refer to Appendix A), the traversal of the derivation tree maintained by the syntax-directed editor was not always intuitive to the user. In some cases, additional nodes were inserted into the derivation tree which confused the user. In order to become proficient with the PSDL Editor, the user was required to become familiar with the unique features of the attribute grammar.

A typical example is the editing of a type_declaration within a data stream structure. Figure 5 depicts a graphical representation of the type_declaration structure from the PSDL grammar definition (starting with line 25 of Appendix A). Figure 6 depicts how the same structure would be represented in the derivation tree of the syntax-directed editor, based on the attribute grammar. The derivation tree provided additional nodes to represent the set of types which were allowed INTEGER. REAL, BOOLEAN, and User_Defined. However, the definition of the attribute grammar was not intuitive to the typical CAPS user. Figure 7 depicts four snapshots of the syntax-directed editor in an example where the user wishes to modify the type used for the data stream av_consent_switch. Initially, the data stream is of type switch_position, a User_Defined type. The required type for the data stream is BOOLEAN. The user selects the type name, depicted by the underlined switch_position in the first snapshot. The user deletes this entry and expects to be presented with the decl_type_name options. However, syntax-directed editor is still located at the id node below DTypeUserDefined within the derivation tree (refer to the second snapshot). The user is required to ascend to the parent (i.e., decl_type_name) from the Structure menu and cut off the existing branch of the

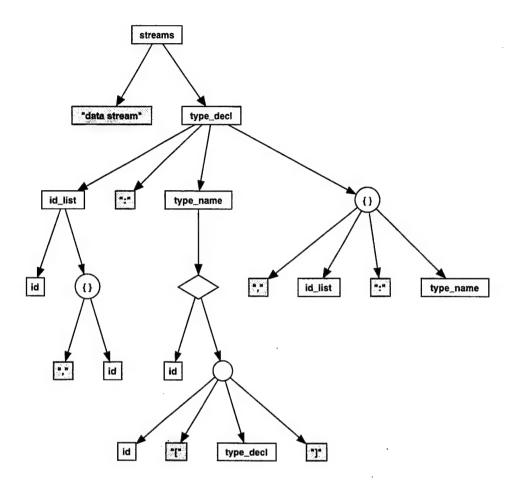


Figure 5. PSDL Type Declaration

derivation tree from the Edit menu (depicted in the third snapshot). The syntax-directed editor is now positioned within the derivation tree to prompt for the BOOLEAN option, which is selected and depicted in the fourth snapshot.

Additionally, the syntax-directed editor's attribute grammar stipulates an order in which PSDL structures can be arranged. In some cases, this order is defined in the PSDL grammar. In other cases, it is solely defined by the syntax-directed editor. Regardless of the PSDL grammar, the syntax-directed editor requires a specific ordering of PSDL structures. The syntax-directed editor provides the user assistance

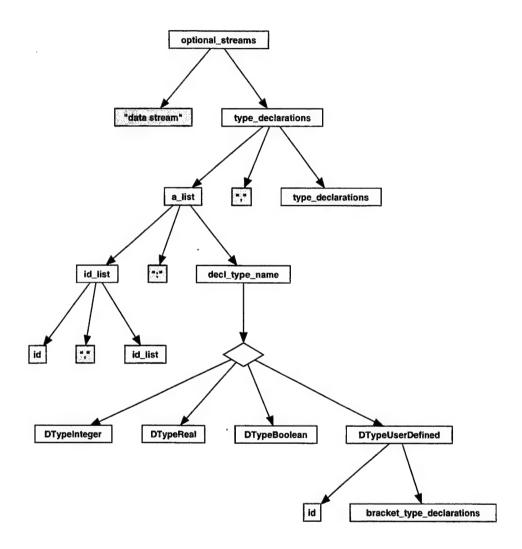


Figure 6. Derivation Tree Type Declaration

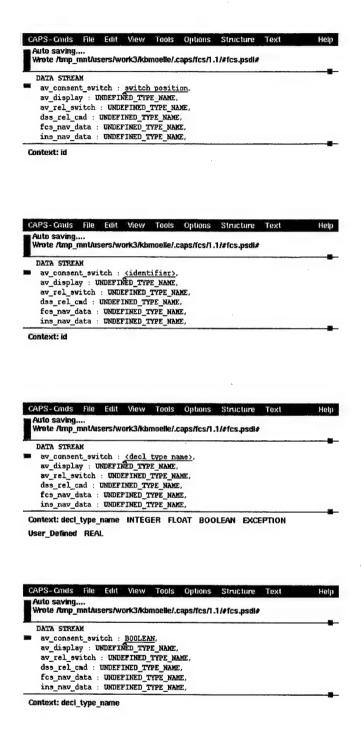


Figure 7. Syntax-Directed Editor: Derivation Tree Traversal

by prompting for all valid constructs at the cursor location. However, the user is required to either memorize the order stipulated by the attribute grammar or to search through the prototype in order to identify the location for the desired construct.

C. RESEARCH GOAL

While the PSDL Editor provided advanced features for specifying the requirements of a prototype in PSDL, it also introduced artificial boundaries and linear constraints that impacted a users productivity. The goal of this research is to develop the next generation of the PSDL Editor in an attempt to overcome these impediments.

As this research was envisioned, the development of the next generation of the PSDL Editor was divided between the graph editor and a background checker driver, written in Ada. This research was centered about the graph editor. This project was implemented as an evolutionary task. The CAPS Release 1 graph editor was used as the baseline from which this research was initiated. Additional work on the graph editor was accomplished partly through the class project for NPS CS4520 (AY96Q4).

II. PROTOTYPE SYSTEM DESCRIPTION LANGUAGE (PSDL)

The primary reference for the Prototype System Description Language is the paper "A Prototyping Language for Real-Time Software" by Luqi, Berzins, and Yeh [Ref. 3]; which describes the semantics of PSDL. Refinements to the PSDL semantics are outlined in Professor Luqi's class notes from the Naval Postgraduate School course CS4920: Computer Aided Prototyping Systems (AY96Q3) [Ref. 9]. These two sources, along with the PSDL syntax provided as Appendix A, define PSDL.

This chapter provides an introduction to PSDL as background information for a discussion of the PSDL Editor. Here PSDL is described within the context of a CAPS tool set implementation. This serves two purposes. First, a background in PSDL is necessary in order to understand the required operation of the PSDL Editor. CAPS provides a language-sensitive editor. The PSDL Editor is solely dedicated to CAPS, incorporating many language dependent features designed to simplify the specification of a PSDL prototype. Second, this introduction serves to inform the CAPS user of limitations imposed by a CAPS implementation which deviate from the PSDL semantics.

CAPS provides a set of integrated tools (reference Figure 1) designed to facilitate the development of executable prototypes using PSDL. Limitations within the tool set have resulted in a CAPS implementation that does not fully comply with the PSDL semantics. With each new release of CAPS, an attempt is made to remove these limitations. This research effort comes between CAPS implementations. Currently, CAPS is at Release 1. Release 2 is planned, but not yet fully defined for all CAPS subsystems. Release 2 does contain PSDL syntax changes. These changes are reflected in this introduction as well as in the next release of the PSDL Editor. However, any changes which may be incorporated into the Execution Support subsystem tools (excluding those changes needed to support the new PSDL syntax) are unde-

fined at this time, and hence are not addressed here. Thus, the PSDL configuration which is addressed here is the CAPS Release 1 implementation with the addition of the CAPS Release 2 updated syntax. As a result of the syntax changes which will make up CAPS Release 2, prototypes developed with this PSDL Editor will not be compatible with CAPS Release 1.

Since CAPS users are presented with an implementation which does not fully support the PSDL semantics, users could potentially design a prototype which utilizes a limitation. Limitations with an implementation require special consideration by the prototype developer and may require the designer to over-constrain the prototype in order to work around a limitation. For example, within the PSDL semantics, stream names are local. However, the CAPS Release 1 implementation operates as if stream names are global. In order to maintain the semantics of PSDL, a prototype designer must over-constrain the prototype by forcing unique stream names in order to maintain local streams.

Thus, concessions must be made in the prototype design to make up for limitations in the support provided by the tools. The concessions provided here are in full compliance with the PSDL syntax. They simply over-constrain the design in order to work around a limitation. Prototypes which adhere to these concessions should be compliant with future releases of CAPS. Prototypes which do not adhere to the correct semantics of PSDL will most likely "break" in future releases.

A. PSDL PROTOTYPE

Figure 8 depicts the partial taxonomy of a PSDL prototype. A PSDL prototype consists of a set of components. PSDL provides two kinds of components: abstract state machines and abstract data types. An operator is an instance of an abstract state machine and can be introduced into the prototype by either an abstract state machine component or an operator of an abstract data type component. In PSDL, the operator is the basic computational entity [Ref. 10].

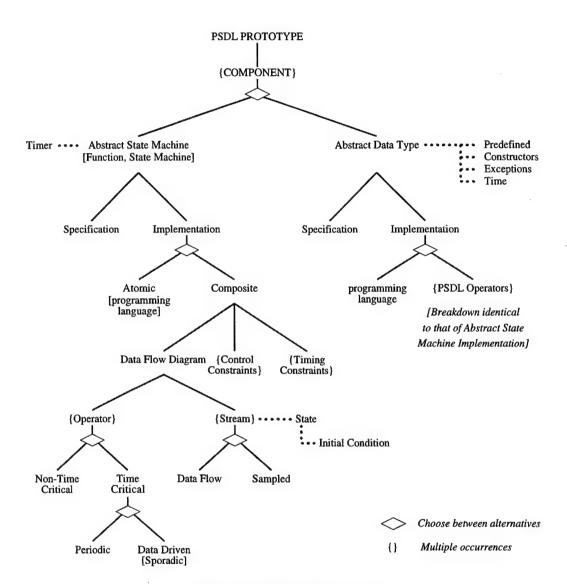


Figure 8. PSDL Taxonomy

A prototype is decomposed into a network of operators which communicate through data streams. Data streams carry objects of a fixed data type. Data stream objects can be either predefined data types or types defined by abstract data type components.

The PSDL syntax provides for the description of this network as a data flow diagram in which the vertices represent operators and the edges represent data streams. By itself, the data flow diagram is not sufficient to support the definition of a real-time system. PSDL augments the data flow diagram with control and timing constraints. The augmented data flow diagram together with a set of precedence rules provides sufficient information for the CAPS Execution Support subsystem to automatically generate the "supervisory" code used to control the execution and communications of operators.

While the operator is the PSDL computational entity, the PSDL syntax does not provide for the complete implementation of all operators. A general purpose programming language is required to implement some operators³. Currently, CAPS supports the programming languages Ada and TAE to implement operators. CAPS generates Ada code for "supervisory" control.

The "supervisory" code generated by the CAPS Execution Support subsystem controls the execution of PSDL operators. As can be seen from Figure 8, PSDL contains both time critical and non-time critical operators. Time critical operators are controlled by a static schedule. Non-time critical operators are controlled by a dynamic schedule. The static schedule is executed as a high priority Ada task. The dynamic schedule is executed as a lower priority Ada task that runs whenever the static schedule idles. [Ref. 9]

³Operators which are implemented using a general purpose programming language are called atomic operators.

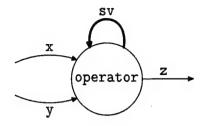


Figure 9. State Machine example

1. Component Structure

Every PSDL component is made up of two parts: a specification and an implementation. The specification defines the component's interface and provides for the documentation of behavior and requirements tracing. The implementation can be performed using a PSDL supported programming language (for atomic operators) or further defined in PSDL (for composite operators).

2. Abstract State Machines

A PSDL operator is a state machine. A state machine contains a finite number of inputs, outputs, and state variables; each of which are represented as a data stream. Figure 9 provides an example of a state machine with two input streams (x and y), one output stream (z), and one state variable⁴ (sv). A function is a state machine with no state variables.

When the state machine is executed, it reads one data object from each of the input streams. The output values of the state machine depend solely upon the current values of the input objects that were read and the current value of the state variables. At most, one data object is written to each output stream. [Ref. 3]

An operator that is implemented using a PSDL supported programming lan-

⁴In this example, state variables are depicted with bold lines. This is the convention used by the graph editor.

guage is referred to as atomic. In this case, the operator's implementation specifies the programming language as well as the module name used to implement the operator. Operators that are not atomic are composite. A composite operator is itself decomposed into a network of operators; communicating through data streams. This establishes a parent-child relationship between operators. The composite operator being the parent and the operators contained in the decomposed network being the children.

Composite operators provide for a hierarchical decomposition of a prototype. At the top most level, the prototype consists of a single operator, referred to as the root operator⁵. Children of the root operator can either be implemented as atomic operators or as composite operators. At the lowest level, all operators are implemented as atomic operators.

PSDL provides timers as predefined abstract state machines. A timer behaves similar to a stopwatch. A timer is modeled as an elapsed time value and a run switch. As long as the run switch is on, the elapsed time value is incremented. Timers have four operations: start, stop, reset, and read. Start turns on the run switch. Stop turns off the run switch. Reset turns off the run switch and sets the elapsed time value to zero. Read returns the current value of the elapsed time. [Ref. 3]

Timers are declared in the implementation section of a composite operator. Timers differ from operators in that they do not appear in the data flow diagram. Timer values (i.e, the result of a read operator) are accessed by referring to the timer by name within the control constraints of an operator. PSDL semantics provide for the insertion of a timer value into a data stream [Ref. 3]. Currently, this feature is not supported in the CAPS tools. The prototype designer should limit the use of timers to operator constraints.

⁵The PSDL Editor only supports the root operator being implemented as a composite operator.

3. Abstract Data Types

The abstract data type component introduces a new type name for a user defined type. An abstract data type defines a set of values and a set of operations on that value set [Ref. 11]. User defined data types are provided in addition to the set of predefined data types: boolean, character, string, integer, real, and exception. All PSDL abstract data types are immutable. An immutable type has a fixed set of values and the properties of an instance of a type cannot be changed [Ref. 11]. PSDL has no mutable types or global variables⁶ in order to prevent coupling problems between operators [Ref. 3].

The set of operations defined by an abstract data type component are implemented as PSDL operators. Similar to operators defined by an abstract state machine component, an operator defined in an abstract data type component can be implemented either in a PSDL supported programming language or as a PSDL augmented data flow diagram. Since an immutable type has no memory (i.e., no state variables) [Ref. 11], it is a good design principle to limit abstract data type operators to functions and avoid state machines and timers.

Data streams carry objects of an abstract data type, the data stream type being assigned in a PSDL type declaration construct. Abstract data type operators can appear within a data flow diagram as an operator by providing the type name and the operator name separated by a '.' (e.g., stack.push where stack is the type name and push is the operator name).

Unusual behavior of an operator can be flagged through the use of an exception. PSDL facilitates this through the use of the built-in abstract data type of exception. Exceptions are identified by name. PSDL provides for the raising of an exception of a given name, detecting the presence of an exception with a given name,

⁶The PSDL semantics specify that all streams are local. However, as currently implemented in CAPS Release 1, streams are global, based on the stream name. Thus, to be consistent with PSDL semantics, streams that are not local should have unique names. This is a concession made in the design of the prototype to work around a limitation in the CAPS tool set implementation.

and determining if no exception was raised (i.e., normal).

The PSDL syntax provides for a time literal (reference production rule 36 of Appendix A) which consists of an integer and an associated time unit (i.e., microseconds, milliseconds, seconds, minutes, or hours). CAPS Release 1 does not support any time resolution less than one millisecond. Thus, the CAPS Execution Support subsystem converts all time literals to a natural number of milliseconds. Any time literal less than a millisecond is converted to one millisecond. The PSDL does not provide a predefined abstract data type which can be used to support time literals.

B. DATA FLOW DIAGRAM

At the top level, a prototype consists of an operator, whose implementation is provided by an augmented data flow diagram. After the initial operator (i.e., the prototype level), the designer may choose to implement the behavior of an operator with a network of simpler operators or with an atomic operator. This process of decomposing complex operators into simpler composite operators is continued until all remaining operators are atomic. The resulting structure is a hierarchical tree, in which the root is the prototype operator, all internal nodes are implemented as composite operators, and all leaf nodes are implemented as atomic operators.

An augmented data flow diagram consists of a data flow diagram depicting a network of operators (communicating through data streams) as well as control and timing constraints on the network. A sample prototype is depicted in Figure 10, in which two data flow diagrams are included. The root operator is implemented as a composite operator, and hence has an associated data flow diagram. The operator b is also a composite operator and contains an associated data flow diagram.

A data flow diagram can accept inputs from an external producer and produce outputs which are used by an external consumer. The inputs and outputs of a composite operator are declared in the composite operator's specification section. These inputs and outputs correspond to the inputs and outputs depicted in the parent data

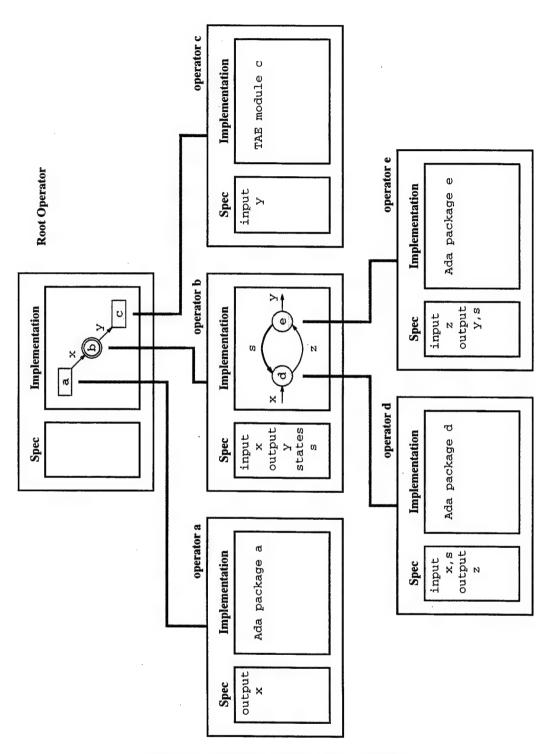


Figure 10. Sample PSDL Decomposition

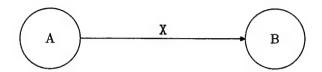


Figure 11. Operator Precedence Relationship

flow diagram. This can be seen in Figure 10. Within the operator b component, the specification declares x to be an input and y to be an output. These inputs and outputs correspond to the streams into and out of the subject operator (i.e., b) depicted in the parent data flow diagram (i.e., the root operator). The root operator corresponds to a closed system, in which there are no external inputs or outputs.

While the PSDL syntax supports a textual description of the augmented data flow diagram, the PSDL Editor provides a graphical interface to the user for creating, maintaining and browsing the data flow diagram. Within the graphical interface, an operator is represented as a bubble and a data stream is represented as a directed line segment from the producer operator to the consumer operator.

A precedence relationship establishes a partial ordering of the execution schedule based on the data stream paths between operators. Figure 11 depicts two operators, A and B, which share a data stream, X. The execution of B requires the availability of data from X. Hence, operator A must be executed prior to the execution of operator B.

Figure 12 depicts the same state machine with a feedback loop added, data stream FB. In this situation, each operator depends on the output of the other operator. CAPS requires that every cycle within a data flow diagram be broken with a state stream. That is, one of the data streams on the cycle must be designated a state stream and provided with an initial value. The initial value of the state stream breaks the circular precedence relationship that would otherwise be impossible to schedule. In order to obtain a valid PSDL prototype, the designer must ensure that the data streams (excluding state streams) of every data flow diagram form a directed acyclic

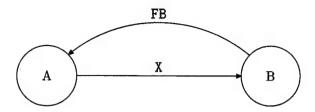


Figure 12. Cyclic Precedence Relationship

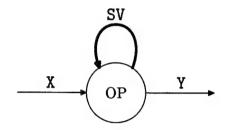


Figure 13. Data Flow Diagram Loop

graph (DAG). Each cycle which is found in the data streams of a data flow diagram must be broken, either by the removal of a data stream or by designating one of the data streams to be a state stream. This rule applies to simple loops as depicted in Figure 13.

1. Operators

In support of real-time prototypes, PSDL provides both time critical and non-time critical operators (reference the taxonomy of an operator depicted in Figure 8). Execution of time critical operators can be triggered either periodically or sporadically (i.e., data driven).

In order for the CAPS Execution Support subsystem to obtain a schedule which executes each operator consistently with the timing constraints of the augmented data flow diagram, a bound must be placed on the execution time of the operators. This bound is referred to as the **maximum execution time** (MET). An operator is time critical if and only if it has been assigned an MET. Otherwise, the

operator is non-time critical. [Ref. 3]

A time critical operator is triggered periodically if it contains a **period** (P) timing constraint. Otherwise, the operator is triggered sporadically, based on the arrival of data (i.e., data driven), and must contain a data trigger control constraint.

Since a PSDL prototype represents a closed system, often it is necessary to include operators which are not considered to be part of the prototype to create the closed system. PSDL facilitates the inclusion of these external systems as terminators. Terminators are operators with an assigned MET of zero⁷, and thus the time required to execute the terminator is not counted against the prototype execution time. The CAPS maintains a simulated real-time clock. During the execution of a terminator, the simulated real-time clock is turned off. Terminators are represented in the PSDL Editor by a rectangular bubble within the data flow diagram. Operators with a non-zero MET (including those operators with an undefined MET) are represented in the PSDL Editor by a circular bubble.

2. Streams

Streams are used to communicate data objects of a fixed data type from a set of one or more producer operators to a set of one or more consumer operators [Ref. 9]⁸. While the PSDL syntax and the PSDL Editor represent a stream as a link from one producer to one consumer, multiple producers and multiple consumers are supported by matching stream names (i.e., identifiers) within the stream scope.

PSDL provides two types of data streams: data flow streams and sampled streams. A data flow stream guarantees that no data object is lost or replicated. The data flow stream behaves like a first-in-first-out (FIFO) queue with a length of one for each consumer. A sampled stream behaves like a single memory cell which contains one data object for each consumer. The most recent data value is obtained each time

⁷Since all terminators have an MET of zero, they are considered time critical and are placed on the static schedule.

⁸This implementation is a change from that presented in [Ref. 3].

the stream is read. Thus, data objects may be lost if associated with a fast producer or replicated if associated with a slow producer. The type of data stream used is determined by the consuming operator's trigger control constraint. If the consuming operator contains a **triggered by all** control constraint for a set of streams, those streams are data flow streams. Otherwise, the stream is a sampled stream.

The FIFO queue length of one for a data flow stream restricts the relative execution rates between the producer and consumer operators. In order to guarantee that no data object is lost or replicated, the output rate of the producer must not exceed the execution rate of the consumer for all data flow streams. No such restriction is placed on a sampled stream.

3. State Streams

State streams provide a state machine with memory. State streams are also used to schedule data flow diagrams that would otherwise be impossible to schedule due to circular precedence constraints. A state stream is declared in the specification section of the component in which the state stream first appears in the data flow diagram. In Figure 10, the state stream s first appears in the data flow diagram of operator b. The state stream declaration appears in the specification of operator b as well. Within the components of operators e and d, the producer and consumer of s respectively, s only appears within the specification's output and input declarations.

A state stream differs from a data stream in that a state stream must include an initial value. It is the initial value of a state stream which makes it possible for a state stream to break a circular precedence constraint. A state stream is also required when connecting time critical and non-time critical operators [Ref. 9].

Note that, under CAPS Release 1, all state streams are implemented as sampled streams regardless of the trigger constraint. Data flow state streams are not provided.

Table I. PSDL Constraints

	Operator		
Constraint	Non-Time Critical	Tim	e Critical
		Periodic	Sporadic
MET	Undefined	Required	Required
Period		Required	
Finish Within		default: Period	
MRT			$\operatorname{Required}^a$
MCP			default: MRT-MET
Data Trigger	Optional	Optional	Required
Conditional Exec	Optional	Optional	Optional
Output Guard	Optional	Optional	Optional
Exceptions	Optional	Optional	Optional
Timers	Optional	Optional	Optional

Constraint	Operator		Constraint	Stream	
	Terminator	Operator		Data Flow	Sampled
MET	0	Otherwise	Data Trigger	by all^b	Otherwise

^aIf MCP is set instead, MRT defaults to MCP+MET.

4. Constraints

Constraints augment the data flow diagram in order to control the execution of operators, generation of output, processing of exceptions, and timers. Constraints also determine the implementation of data streams. Table I lists the constraints required to obtain a specified functionality of operators and streams as well as those constraints which are optional.

Execution guards provide for the conditional execution of an operator. Execution guards are provided by the constructs:

operator
$$\langle op_id \rangle$$
 [triggered by all $\langle id_list \rangle$] [if $\langle expression \rangle$] operator $\langle op_id \rangle$ [triggered by some $\langle id_list \rangle$] [if $\langle expression \rangle$]

Only one of the above constructs is permitted for each operator of a data flow diagram. Each construct has two conditions, a data trigger condition and an if condition. The

^bUnder CAPS Release 1, all state streams are implemented as Sampled Streams.

two conditions can be used independently or together to provide an execution guard on the operator.

The data trigger condition **triggered by all** is satisfied only if all of the streams listed in the $\langle id list \rangle$ have new data objects (i.e., has been written to since the last read operation). The data trigger condition **triggered by some** is satisfied if at least one of the streams listed in the $\langle id list \rangle$ has a new data object. A data trigger condition is required for a sporadic operator. It is an optional execution guard for periodic and non-time critical operators. As can be seen in Table I, the **triggered** by all condition is also used to designate a stream as a data flow stream for the consuming operator.

The second condition within the execution guard is the if condition. Identifiers of the conditional $\langle expression \rangle$ are limited to those of input streams as well as those of visible timers and exceptions.

Output guards provide for the conditional transmission of an operator's output stream. The operator's result is not transmitted over the stream unless the output guard expression is satisfied. One output guard is permitted for each of the operator's output streams. Identifiers of the output guard expression are limited to those of the operator's input and output streams as well as those of visible timers and exceptions.

Exception guards provide for the conditional raising of an exception. Multiple exception guards are permitted, one for each exception to be raised. The resulting exception is transmitted on all output streams of type exception leaving the operator, subject to any output guard constraints defined for those streams. Identifiers of the exception guard conditional expression are limited to those of the operator's input and output streams as well as those of visible timers and exceptions. If the exception guard conditional expression is missing, it is assumed to be true.

Timer control constraints provide for the conditional control of a timer. Conditional control is provided to start, stop, and reset a timer. Identifiers of the timer control conditional expression are limited to those of the operator's input and out-

Table II. PSDL Timing Constraints; From [Ref. 6]

Periodic Operator	Sporadic Operator
Maximum Execution Time (MET)	Maximum Execution Time (MET)
Period (P)	Minimum Calling Period (MCP)
Finish Within (FW)	Maximum Response Time (MRT)

put streams as well as those of visible timers and exceptions. If the timer control conditional expression is missing, it is assumed to be true.

There are five⁹ timing constraint parameters used for a PSDL operator. These parameters are listed in Table II, under the class of time critical operators where they are used, and are defined as follows [Ref. 6]:

- Maximum Execution Time (MET) An upper bound on the execution time from start to finish of an operator.
- **Period** (P) The elapsed time between two successive triggerings of a periodic operator at the earliest possible moment.
- **Finish Within (FW)** An upper bound on the elapsed time that may pass between the earliest time that a periodic operator can be triggered and the latest time the operator must produce all output stream values.
- Minimum Calling Period (MCP) A lower bound on the amount of time that may pass between successive triggerings of a sporadic operator.
- Maximum Response Time (MRT) An upper bound on the amount of time that may elapse from the arrival of data which triggers an operator to the time that all output streams have been produced.

The absence of a MET constraint is used to indicate that the operator is non-time critical. Otherwise, the operator is time critical. Only time critical operators are allowed to have timing constraints [Ref. 9]. Only the MET is displayed by the PSDL Editor on the data flow diagram.

⁹MET appears twice in Table II, under both Periodic and Sporadic operators.

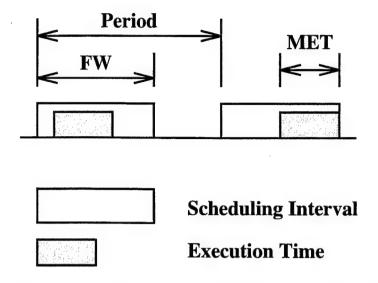


Figure 14. Periodic Timing Constraints; From [Ref. 9]

Periodic operators are scheduled at nearly regular time intervals. Figure 14 depicts the relationship between the timing constraints for a periodic operator. The MET and Period (P) must be assigned for a periodic operator. If a FW constraint is not specified, it is defaulted to P.

Jitter is an upper bound on the time that may elapse between two successive executions of a periodic operator. The worst case of jitter is obtained with the default value of the FW constraint (i.e., FW = P). In such a case, the jitter is given by twice the difference of the P and the MET. Jitter can be reduced to zero by setting the FW constraint equal to the MET.

Sporadic operators are triggered by the arrival of data. Figure 15 depicts the relationship between the timing constraints for a sporadic operator. The MET must be assigned along with either the MCP or the MRT or both.

Limits are placed on the values of MCP and MRT in the absence of a pipelined execution implementation. The MCP must be greater than or equal to the MET. The MRT must be greater than or equal to twice the MET. If the MRT constraint is specified and the MCP constraint is left unspecified, then the MCP defaults to the

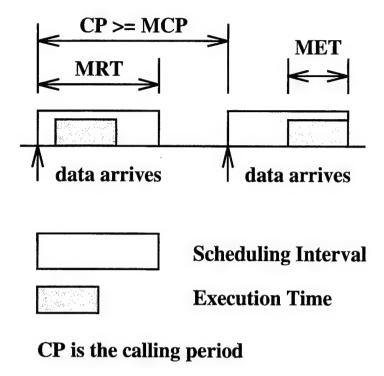


Figure 15. Sporadic Timing Constraints; From [Ref. 9]

difference between the MRT and the MET. If the MCP constraint is specified and not the MRT constraint, then the MRT defaults to the sum of the MCP and the MET.

One additional timing constraint is provided for streams. Latency is the lower bound on the elapsed time from when data is written to a stream by the producer until the time that the data can be read from the stream by the consumer. Latency is also displayed by the PSDL Editor in the data flow diagram.

C. HIERARCHICAL NETWORK

A PSDL prototype is built of PSDL operators, implemented as either data flow diagrams or with a PSDL supported programming language, in a hierarchical manner. The root operator is at the top of the hierarchy, which is always implemented as a data flow diagram. Each of the operators referenced in the data flow diagram is also specified as a PSDL component (either as an abstract state machine or as an

operator of an abstract data type).

The specification of each operator establishes the interface to the operator while the details are hidden in the implementation. For a given operator, the inputs and outputs declared in the specification correlate to the input and output streams of the corresponding operator of the parent's data flow diagram. States depicted in the data flow diagram found in an operator's implementation are also declared in that operator's specification. Exceptions processed in an operator's implementation are also declared in that operator's specification. Timers processed in an operator's implementation are declared in that operator's implementation. The declaration of input and output streams, state streams, and exceptions is provided for with the automatic PSDL code generation of the PSDL Editor. However, the PSDL Editor has no provisions for the automatic generation of the timer declaration. It is the responsibility of the user to properly declare all timers.

The use of a hierarchical structure comes with additional semantic requirements.

1. Root Operator

A PSDL prototype contains a single root operator. Any operator that is not in a hierarchical decomposition of the root operator is considered to be a multiple root operator and represents an error. Use of the PSDL Editor ensures that a multiple root operator error can not occur. A single root operator is provided by the PSDL Editor upon entry. All subsequent operators are introduced as decompositional operators within a hierarchy. Within the PSDL Editor, if a composite operator is deleted, the child operators will be deleted.

CAPS follows the convention that the name¹⁰ of the root operator is the same as that of the file name that contains the prototype. The extension ".psdl" is added

¹⁰In order for CAPS to provide for duplicate operator names in different scopes, the PSDL Editor appends an operator identification number to the operator name. This identification number is not included in the PSDL prototype file name.

to the file name.

While not limited in the PSDL syntax, the PSDL Editor limits the root operator to one which corresponds to a closed system. There are no inputs to, or outputs from, the root operator. If inputs and/or outputs are required, the scope of the prototype should be expanded so that the required inputs and/or outputs are contained within the prototype¹¹. The only $\langle attributes \rangle$ (reference production rule 8 in Appendix A) permitted within the specification of the root operator are **generic**, states, and exceptions.

In addition, the PSDL Editor limits the root operator of the prototype to a PSDL implementation. No provisions are made in the PSDL Editor for a root operator implemented in a programming language.

2. Stream Consistency

Within the hierarchical structure of PSDL, a composite operator is implemented as a data flow diagram of a PSDL component at a lower level. All inputs to the composite operator must be utilized as an external input to at least one of the operators in the decomposed data flow diagram. Likewise, all outputs of the composite operator must be utilized as an external output from at least one of the operators in the decomposed data flow diagram. A similar set of rules require that all external inputs to a decomposed data flow diagram must be inputs to the composite operator and all external outputs to a decomposed data flow diagram must be outputs from the composite operator. [Ref. 3]

External streams in a decomposed data flow diagram inherit the stream's data object type of the the composite operator. In addition, which type of stream (i.e., data flow stream or sample stream) is derived from the trigger constraint of the

¹¹User provided inputs as well as output displays to the user are typically handled by an operator (or terminator) contained within the prototype. Such an input/output operator may be implemented in TAE. While user input and/or output may be considered external, the use of an operator (terminator) to capture the requirements and specification of the input and/or output is considered to "close" the prototype system.

consuming operator. For a composite operator, as explained above, an input to a composite operator must also be an input to at least one operator in the decomposed data flow diagram. The trigger constraints of both the composite operator and those of the applicable decomposed operators are used in the derivation of the type. [Ref. 3]

3. Timing

The MET and the MRT of a composite operator must be consistent with the implementation of the operator as a data flow diagram. The MET and the MRT of the implementing data flow diagram must be no larger than that of the composite operator. The Period and the MCP of a composite operator are inherited be the the operators of the implementing data flow diagram.

4. Visibility

The CAPS semantics requires that operator names within a composite operator are to be local to the component. In order to accomplish this, the PSDL Editor supports integer suffixes which are attached to the operator name (reference memo provided in Appendix C). This feature will not be available until CAPS Release 2.

The CAPS semantics provides for all streams to be local. Streams with an identical name out of a common operator are local. Streams with identical names, but out of different operators are not local. However, as implemented in CAPS Release 1, streams are global. That is, any two streams with a common name are visible. In order to maintain the PSDL semantics, all streams that are not desired to be local should have unique names. This is a concession made in the prototype design to workaround an implementation limitation of CAPS Release 1.

When an exception is raised by an operator, the exception is transmitted on all data streams of type exception, regardless of the exception stream label, leaving the operator, subject to the stream output guard. The exception is transmitted only over local exception streams. Thus the exception is not transmitted over exception streams which are outputs of another operator. At least one exception output stream should be provided for each operator which is capable of generating an exception.

[Ref. 9]

A timer is visible within the component in which it is declared. If the component's data flow diagram contains a composite operator, then the timer is visible within the decomposed components.

D. LEXICAL ELEMENTS

Each PSDL component is composed of a sequence of lexical elements. Lexical elements are in turn composed of characters. A lexical element is either an integer literal, a real literal, a string literal, text, an identifier (including keywords), or a delimiter¹².

When a prototype is maintained by the PSDL Editor, the editor will ensure that the prototype is syntactically correct. User input provided through the PSDL Editor's graphical interface are validated as required and are automatically translated into a syntactically correct PSDL prototype. Thus many of the rules presented in this section do not impact the prototype developer since they are maintained by the PSDL Editor. If a developer chooses to maintain a prototype using any other system, it is the responsibility of the developer to adhere to the syntax of PSDL. Very little assistance in the form of error messages is provided to the developer who introduces syntactical errors into a prototype. In most cases, the PSDL Editor will not be able to recover from these syntax errors.

1. Character Set

The PSDL character set is composed of the 95 printable ASCII characters from ASCII ''_' (space) through ASCII '^' (tilde) plus the line feed (ASCII character 10) and horizontal tab (ASCII character 9) characters.

¹²The time literal mentioned earlier is not truly a literal. Rather, it is a grammatical rule which combines an integer literal with a keyword representing the time units.

Right brace, '}', is a special character in that it is included in the PSDL syntax, however, it is not allowed to appear anywhere except the closing of a **description** or an **axioms** structure (reference production rule 45 of Appendix A for the definition of a character and production rules 15 and 16 for the use of '}'). The format effectors vertical tab, carriage return, and form feed can not appear anywhere other than the $\langle text \rangle$ field of the **description** or the **axioms** structures¹³.

2. Integer Literals

An integer literal (reference production rule 43 of Appendix A) is an unsigned number. All integer literals are base ten and do not contain any character other than the digits 0 through 9.¹⁴

3. Real Literals

A real literal (reference production rule 42 of Appendix A) is an unsigned real number. All real literals are base ten. A real number must contain a decimal value (which may be 0), a decimal point ('.'), and a fractional value (which may also be 0). Exponential notation is not allowed.

4. String Literals

A string literal (reference production rule 44 of Appendix A) is any number of characters from the PSDL character set, delimited by quotations ('"'). There are four characters that are not allowed within a string literal: the quotation mark ('"'), the right brace character ('}'), and the format effectors horizontal tab and line feed. PSDL does not specify any limit on string literal length. The empty string is represented as '""'. Strings are case sensitive.

¹³The use of these characters is not recommended.

¹⁴Within the PSDL Editor, integer literals are represented by a C integer data type. In the current implementation, this is a 32 bit value. Only the non-negative values can be represented as an integer literal.

5. Text

Text (reference production rule 49 of Appendix A) can only appear within the description and the axioms structures of PSDL. Within these two structures, text is any number of characters from the PSDL character set, delimitated by braces ('{'} and '}'). Hence, the right brace ('}') can not appear within the text. Any other character, including horizontal tab and line feed, are permitted within the text. Text is the only lexical element that is allowed to cross a line separator.

6. Identifiers

An identifier (reference production rule 41 of Appendix A) consists of a letter, followed by any number of letters, digits, or underscore ('_') characters. All characters of an identifier are significant and are case sensitive. 15

7. Reserved Words

While not addressed in the specification of PSDL [Ref. 3], the implementation of the PSDL Editor utilizes reserved words. A list of these reserved words is provided in Table III. Reserved words can not be used as identifiers within the PSDL prototype. Reserved words differ from identifiers in that reserved words are case insensitive (e.g., OPERATOR, Operator, and operator are all reserved words).

Table IV contains additional PSDL keywords that do not match the syntax of an identifier and hence are not reserved. However, they are still tokens within the PSDL syntax. The symbol '' is used to represent a single space. This single space is part of the keyword and can not be altered by removal, adding of additional spaces, or replaced with a horizontal tab.

In addition to the above keywords (Tables III and IV), PSDL defines a set of identifiers that are available to the prototype developer. This set of identifiers and

¹⁵The PSDL Editor treats identifiers as being case sensitive. Note that Ada identifiers are case insensitive [Ref. 12]. Since CAPS generates control code in Ada it is not advisable to name two identifiers that only differ in case. Moreover, the CAPS Release 2 PSDL Editor will convert all characters of the identifiers to lower-case.

Table III. PSDL Reserved Words

abs	false	min	sec
all	generic	\mathbf{mod}	some
and	graph	$\mathbf{m}\mathbf{s}$	specification
axioms	hours	\mathbf{not}	states
boolean	if	operator	${f timer}$
description	implementation	or	triggered
\mathbf{edge}	initially	output	true
\mathbf{end}	input	period	type
exception	integer	property	vertex
exceptions	keywords	real	xor
external	microsec	rem	

Table IV. Additional PSDL Keywords

$control_{\sqcup}constraints$	$maximum_{\sqcup}response_{\sqcup}time$	$\mathbf{start} \sqcup \mathbf{timer}$
$\mathbf{data}_{\sqcup}\mathbf{stream}$	minimum⊔calling⊔period	$\mathbf{stop}_{\sqcup}\mathbf{timer}$
$\mathbf{finish}_{\sqcup}\mathbf{within}$	required⊔by	$\mathbf{triggered}_{\sqcup}\mathbf{by}$
$maximum_{\sqcup}execution_{\sqcup}time$	$\mathbf{reset}_{\sqcup}\mathbf{timer}$	

their application are provided in Table V.

Table VI contains additional identifiers that are defined by the PSDL Editor for the purpose of describing the data flow graph. These identifiers appear in **PROPERTY** constructs of the PSDL syntax (reference production rules 20 - 23 in Appendix A). The attributes of the data flow diagram that are controlled by these

Table V. Predefined PSDL Identifiers

Identifier	Application
ADA	Implementation Language
TAE	Implementation Language
other	Place holder for other implementation languages
normal	Exception
character	Predefined data type
string	Predefined data type

Table VI. PSDL Editor Identifiers

Identifier	Application
color	Integer representing color of Operator
$is_terminator$	TRUE if Operator is a Terminator
label_font	Integer representing font of Label
label_x_offset	Signed integer representing relative y position of Label
$label_y_offset$	Signed integer representing relative x position of Label
latency_font	Integer representing font of Latency
latency_x_offset	Signed integer representing relative y position of Latency
latency_y_offset	Signed integer representing relative x position of Latency
met_font	Integer representing font of MET
met_x_offset	Signed integer representing relative y position of MET
met_y_offset	Signed integer representing relative x position of MET
radius	Integer representing radius of Operator
spline	List of absolute x, y positions of Splines
x	Absolute x location of Operator
у	Absolute y location of Operator

identifiers are maintained by the PSDL Editor and are hidden from the user by the PSDL Editor. They will be visible in the PSDL prototype code generated by the PSDL Editor.

8. Delimiters

Delimiters are required to separate adjacent lexical elements. Delimiters include a space character (except when included in a string literal or text), a line feed, or one of the symbols listed in Table VII.

9. Comments

The PSDL syntax does not provide for comments in the sense of comments provided by languages such as Ada. Provisions are made for structured documentation of the prototype. The format and placement of these structures is defined by the PSDL syntax (reference Appendix A). The reserved words **description**, **axioms**, **keywords**, and **required by** are tokens used to introduce documentation into the prototype.

Table VII. PSDL Delimiters

Note that, while **description** and **axioms** constructs facilitate the textual documentation of the prototype, **keywords** and **required** by constructs are restricted to an $\langle id_list \rangle$.

E. PSDL EXECUTION

CAPS provides facilities for executing a PSDL prototype when supported with software components written in an underlying programming language (e.g., Ada) [Ref. 3]. These software components may be obtained from a software base of reusable components or supplied by the prototype developer.

An executable prototype is generated in three steps, available through the Executive Support subsystem of CAPS. Figure 16 depicts the CAPS Release 1 user interface access to these steps¹⁶. The first two steps (i.e., Translate and Schedule) are used to generate the "supervisory" module which provides for control and communication within the prototype. When Compile is invoked, the "supervisory" module along with the packages used to implement the atomic operators and data types are compiled. The prototype is run by invoking Execute.

Translation actually involves two processes. The first process involves flattening the hierarchical structure of data flow diagrams in an expansion process. The

¹⁶Note that this version of the PSDL Editor is in support of the PSDL grammar which will be integrated with CAPS Release 2. This PSDL Editor is not compatible with CAPS Release 1. Comments on compatibility can be found in Appendix B. Execution of a PSDL prototype under CAPS Release 1 is covered here since it is likely that the same steps will still be required with CAPS Release 2.

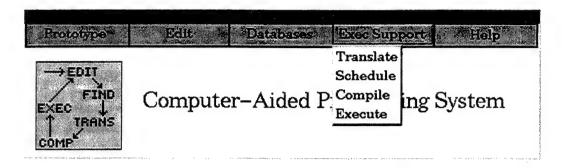


Figure 16. CAPS Release 1 Executive Support

second process is to generate the Ada code required to support the timers, exceptions, stream communication, and control constraints.

The remainder of the "supervisory" module is generated by the scheduler. The scheduler creates a high priority Ada task to control the static schedule (i.e., time critical operators) and a lower priority Ada task to control the dynamic schedule (i.e., non-time critical operators).

All of the generated "supervisory" code is gathered together in one file which is named after the prototype name with an ".a" extension. Which, assuming that the prototype was successfully translated and scheduled, is compiled with the atomic operators and data types. The result is an executable prototype.

III. PSDL SYNTAX/SEMANTIC CONSIDERATIONS

The PSDL Editor is a language sensitive editor with embedded knowledge of PSDL syntax and semantics. The PSDL Editor assists the user by ensuring a syntactically correct prototype, with limited automatic PSDL code generation and limited semantic consistency checking. In the CAPS Release 1 PSDL Editor, this was primarily accomplished by the syntax-directed editor produced by the Synthesizer Generator. The graph editor served two purposes. First, the graph editor was used to present the data flow diagram corresponding to the operator selected in the syntax-directed editor. Second, the graph editor was used to create/maintain the data flow diagram of an operator selected in the syntax-directed editor. Since only the structure, labels, and a few timing parameters of the data flow diagram could be displayed/entered in the graph editor, a simple interface was all that was required to integrate the two segments of the PSDL Editor.

In an attempt to meet the goal of minimizing the artificial boundary produced by implementing the PSDL Editor with both a syntax-directed editor and a graph editor, as well as overcoming the linear constraints resulting from the syntax-directed editor, the user interaction with the syntax-directed editor was to be reduced and the focus placed on the graph editor. As this project is an evolution of the current PSDL Editor, the existing architecture of a syntax/semantics checker and a graph editor was maintained. With the user's focus being placed on the graph editor, an expanded interface was required between the syntax/semantics checker and the graph editor. This change in focus also required a redistribution of the embedded syntax and semantic knowledge between the two editor segments.

This research concentrated on the development of the graph editor. The syntax/semantics checker was implemented as an Ada program, referred to as the background checker, in a parallel development effort by Professor Man-Tak Shing. The

Table VIII. PSDL Interface Structures Summary

Structure	Description	Direction
GRAPH_DESC	Representation of a single operator plus	$SDE \leftrightarrow GE$
	some "global" data.	
ERROR_MSGS	Semantic errors detected by the syntax-	$SDE \rightarrow GE$
	directed editor.	
ACTION	Control requests for next action to be	$SDE \leftarrow GE$
	taken by the syntax-directed editor.	

integration of the the background checker and the graph editor was a shared task. In order to accomplish this parallel development, a new interface was established. Unlike the interface which was utilized in the CAPS Release 1 PSDL Editor, which shared a minimal set of data flow diagram data, this interface shared the complete specification of a single PSDL operator. Additional data was shared to provide "global" prototype information to the graph editor was well as to support control functions. The interface was defined by the file ge_interface.h (reference the source listing of ge_interface.h found in Appendix D on page 195).

Figure 17 depicts the interfaces of the PSDL Editor. External interfaces to the PSDL Editor provide for the reading/writing of the PSDL code as well as for user interaction with the editor through the Graphical User Interface. Internally, all editor segment communication is performed through the ge_interface.h data structures, represented by the dashed box inside the PSDL Editor of Figure 17. The ge_interface.h file contains three structures used to organize communications between the background checker and the graph editor. These structures are summarized in Table VIII.

The GRAPH_DESC interface accommodates the representation of a single PSDL operator. This is symbolized by the box around operator d with an arrow pointing to the GRAPH_DESC data structure in Figure 17. The interface does not support the

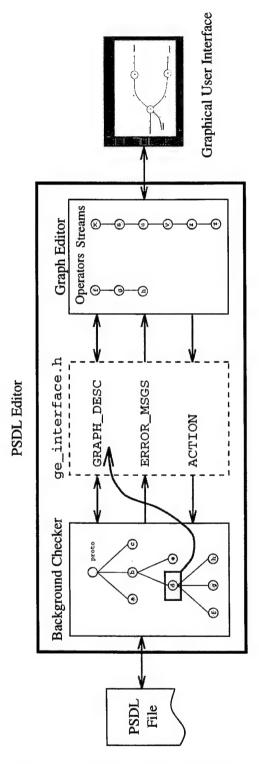


Figure 17. PSDL Editor Interfaces

PSDL representation of the operator¹⁷. Instead, coming from a PSDL file, the PSDL code is parsed by the background checker and attribute values are stored in the prototype data structure, local to the background checker. PSDL reserved words are removed. The association of an attribute value with a PSDL construct is provided implicitly in the data structure. In the other direction, coming from the Graphical User Interface, attribute values entered by the user are associated with, and stored into, the GraphObjectList data structure, local to the graph editor. It is not until the prototype is written to disk by the background checker that the attribute values are mapped into PSDL code.

A. SYNTAX AND SEMANTIC KNOWLEDGE DISTRIBUTION

Since only a representation of the PSDL operator is shared between the background checker and the graph editor, the majority of the embedded syntactical knowledge must reside in the background checker. The background checker is responsible for the input parsing of a PSDL prototype as well as the generation of the PSDL code, which is the output of the PSDL Editor. The syntactical knowledge embedded within the graph editor is limited to that required to validate the user supplied data values associated with a PSDL construct and limited, locally-scoped, semantic validation.

A syntactically correct PSDL prototype is ensured in a two step process. First, all user supplied data values are validated prior to acceptance into the graph editor's data structures. Second, all PSDL code is generated by the background checker, based on the inputs provided by the user from the graph editor.

It is critical that the PSDL Editor generate syntactically correct prototypes. No matter what stage of a prototype's development, the prototype must be syntactically correct. All viewing/editing of a prototype is accomplished from the graph

¹⁷The ge_interface.h accommodates some PSDL code in order to facilitate the editing of selected PSDL constructs which were too complex for the initial implement of the graph editor's user interface. This includes all PSDL types and expressions.

editor. The graph editor does not receive or transmit the PSDL code. The code is encoded into the GRAPH_DESC data structure by the background checker. The background checker is only capable of encoding the PSDL code into the internal data structure representation if it can parse the code. Currently, the background checker does not have any provisions for error correction of a syntactically incorrect prototype. The CAPS PSDL Editor can not be used to edit a syntactically incorrect prototype.

The graph editor is embedded with a limited amount of PSDL semantic knowledge. Semantic consistency is primarily accomplished by limiting the user's options to those that are semantically correct. The graph editor is limited to semantic issues that are local to an operator. The interface between the background checker and the graph editor is limited to a single operator. All global semantic issues are resolved by the background checker.

Note that while a prototype which is not semantically correct can not be translated and executed by the Execution Support tools, it is not necessary that the prototype be semantically correct to be edited with the PSDL Editor. There are potential semantically incorrect prototypes which are not compatible with the PSDL Editor. However, there is no general limitation against semantically incorrect prototypes as there are with syntactically incorrect prototypes.

B. USER SPECIFIED PSDL CONSTRUCTS

It is the graph editor that provides the user interface for PSDL Editor. The graph editor does not understand PSDL syntax. Instead, the graph editor deals with a small collection of data objects from which a PSDL construct is built. It is the data objects provided by the user which are properly formatted with PSDL reserved words by the background checker to produce a PSDL prototype (i.e., PSDL code). The data types which must be supported by the graph editor can be derived from the PSDL grammar (reference Appendix A). Table IX lists the fundamental data objects which must be supported by the graph editor. Production rules provided in Table IX

Table IX. Fundamental PSDL Data Objects

PSDL Data Object	Defining Production Rule
id	41
id list	11
operator id	24
type name	10
integer literal	43
text	49
enumeration	

Table X. Enumeration Values

Enumeration Usage	Enumeration Values, separated by 'I'
Operator Type	Operator Terminator
Implementation Language	ADA TAE Others
Trigger	unprotected By Some By All
Timing	Non-Time Critical Periodic Sporadic
Time Literal Units	microsec ms sec min hour
State Stream Selection	Yes No

refer to those specified in Appendix A which define the syntax of the data object.

Enumeration values are provided in Table X. Some of the enumeration values correspond to PSDL reserved words. However, some are used to free the user from implementation details of PSDL. For instance, the operator type (i.e., Operator | Terminator) does not correspond to any PSDL construct. The selection of a Terminator is encoded by setting the Maximum Execution Time of the operator to zero. In this case, the use of an enumerator, along with semantical knowledge embedded in the graph editor, are used to hide this implementation detail of PSDL from the user.

There were specific PSDL constructs which were deemed too complex to be provided in the initial implementation of the graph editor's user interface. Table XI lists those constructs for which syntactical knowledge was not embedded in the graph

Table XI. Complex PSDL Data Objects

PSDL Data Object	Defining Production Rule
data type	3
interface	7
constraint options	29
expression	39
initial expression list	32

editor. In order to provide full functionality within this version of the editor, separate syntax checkers are provided for these constructs. The graph editor provides a text window from which these constructs may be viewed/edited¹⁸.

C. HIERARCHICAL STRUCTURE

A PSDL prototype is implemented as a network of operators, which may or may not be connected. Syntactically, a PSDL prototype is simply a set of operators¹⁹. A given operator consists of a specification and an implementation construct. It is the data flow diagram, contained in the operator's implementation, which describes the prototype network. The prototype network itself is decomposed in a hierarchical manner, described by a tree, in which each operator can be described by its own network of PSDL operators.

Figure 18 depicts the skeleton of a PSDL prototype²⁰. The prototype consists of nine operator components. The implementation construct of the root operator, proto, identifies the first level of vertices (i.e., operators) and edges (i.e., streams)

¹⁸Syntactical validation of these constructs is required in order to maintain a syntactically correct prototype. As of this writing, this facility has not yet been provided.

¹⁹Actually, a PSDL prototype is a set of operators and abstract data types. However, it is only the operators, which includes operators of an abstract data type, which are executed. For this discussion, we will consider operators only.

²⁰The code presented here does not conform to the CAPS Release 2 semantics. In order to simplify the example, the unique identifier suffixes have been deleted. The unique identifier suffixes will be introduced later in this chapter.

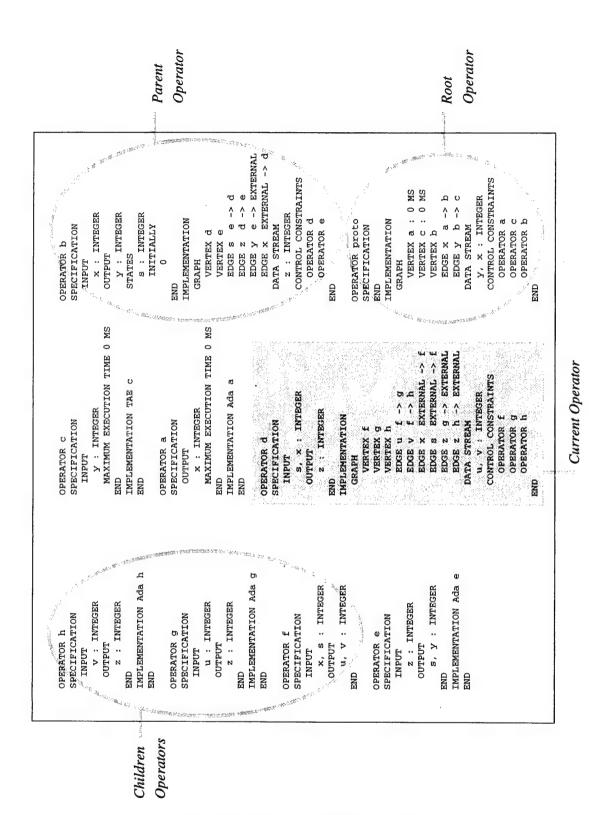


Figure 18. Sample PSDL Prototype

which constitute the prototype network. Each operator identified in this network is contained in the PSDL prototype, the implementation of which may or may not be described as a network of PSDL operators. Figure 19 provides a corresponding hierarchical representation, along with a simple tree representation, of the PSDL prototype provided in Figure 18.

Note that, while the decomposition of the PSDL network is represented as a tree, the PSDL network itself is not restricted to a tree. In general, the PSDL network can be implemented as a disconnected graph containing cycles. Figure 20 depicts how the prototype tree structure is flattened into the PSDL network, which implements the prototype, proto. For each level of the tree, the resulting PSDL network is provided. The resulting network is representative of the outcome of the flattening process used by the Execution Support tools. While the original network of Figure 18, described by operator proto, was a simple tree consisting of three vertices, the flattening of the PSDL network resulted in a connected graph of six vertices containing a cycle.

The tree describes the relationship between operators, not the communication paths between operators. In Figure 18, operator d has been selected as the current operator of interest. From Figure 19, it can be seen that operator b is the parent and that operators f, g, and h are the children. Operator proto is the root operator.

Within the background checker, the entire PSDL prototype is maintained. The interfacing data structure, GRAPH_DESC (contained in ge_interface.h, reference Appendix D, page 195), only facilitates the representation of one operator. The current operator being edited is selected by the user, in a process of navigating through the prototype tree structure. Initially, the root operator is selected by the PSDL Editor as the current operator.

Thus, for the prototype depicted in Figure 18, all nine operators would be maintained simultaneously within the background checker's data structures. Within the graph editor, a single operator, such as the data represented by the shaded rectangle (operator d) in Figure 19, would be maintained. Initially, the operator proto

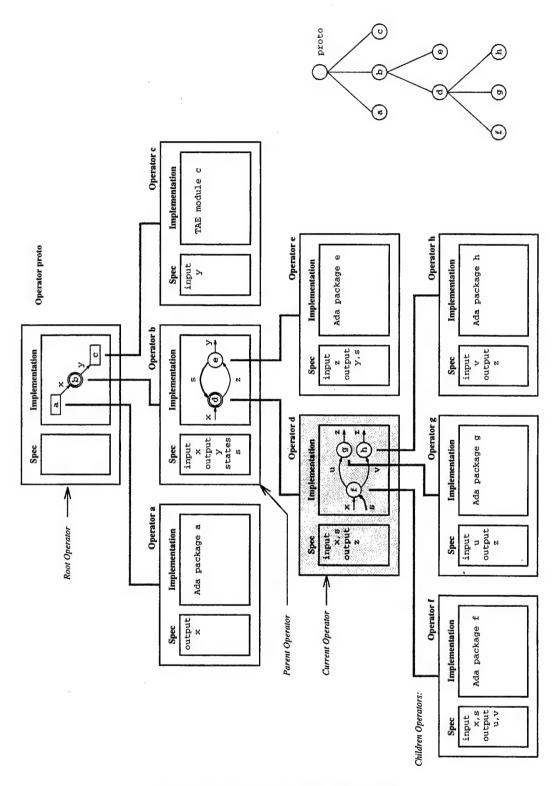


Figure 19. Sample PSDL Hierarchy

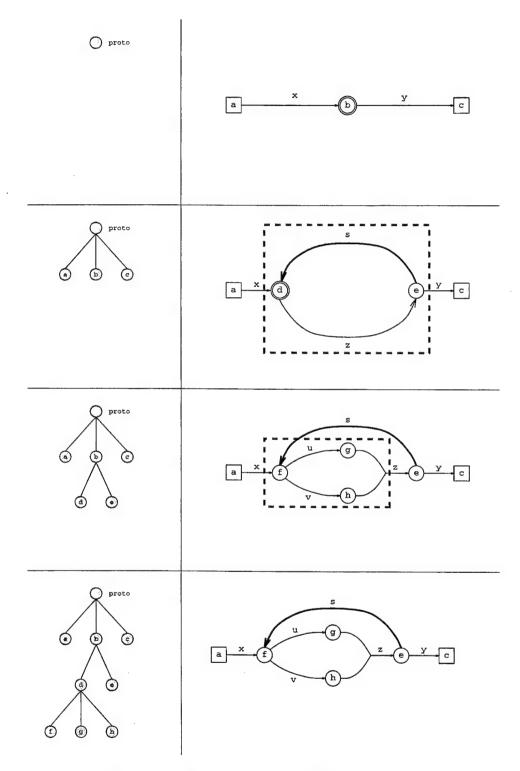


Figure 20. Flattening of the PSDL prototype

would be presented to the user by the graph editor. As the user navigates through the operator tree, the operator represented in the graph editor data structures is replaced with the operator selected by the user. It is the responsibility of the background checker to extract and relay the information for the current operator to the graph editor.

From a graph editor perspective, at most four levels of the prototype tree are relevant at any given time. It is the responsibility of the background checker to orchestrate the data of these four levels with the information contained in the GRAPH_DESC data structure. These four levels are represented in Figure 21, in which the graph editor has no visibility into the shaded regions²¹. The operator of interest is the current operator. This is the operator which is being edited. Both the specification and the implementation constructs of the current operator are available for viewing and editing. One level down from the current operator are the children operators. Portions of the specification construct of the child operator are available for viewing and editing. The input/output constructs of the child's specification are derived from the current operator's data flow diagram. The functionality constructs of the child's specification are also made available through the editing of operator options in the current operator's data flow diagram. Also available from the operator options is the implementation language of the child operator. One level above the current operator is the parent. The parent operator is used by the background checker to derive the current operator's specification construct (i.e., the input and output constructs). The parent operator is not directly visible from the graph editor. The final level which is visible is the root level. The actual root operator is not visible (unless it is the current operator). However, the root level contains global information, which is visible from any level. Specifically, abstract data types are global to the prototype and are visible from any level of the prototype tree.

²¹Note that, while the graph editor may have visibility into a region which is not shaded, the graph editor does not necessarily have the ability to write to an area that is not shaded. Much of this visibility is provided by the background checker providing derived information on the prototype.

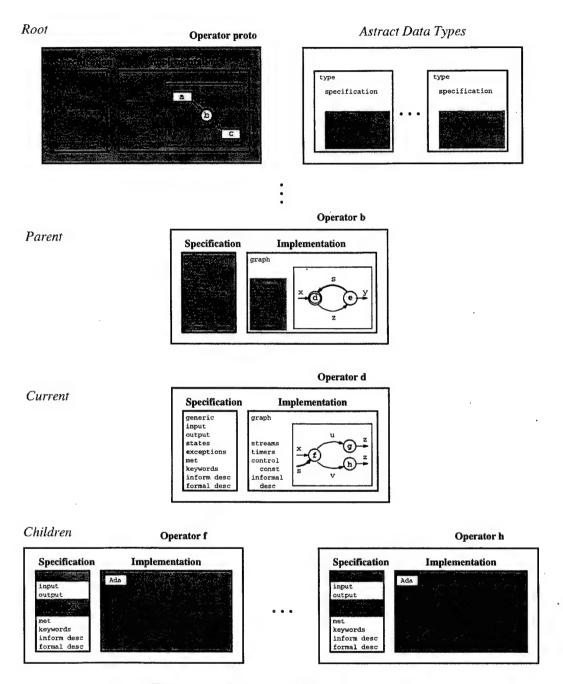


Figure 21. Relevant PSDL Tree Levels

The background checker is responsible for deriving the values to be inserted into the GRAPH_DESC data structure. Figure 22 provides the GRAPH_DESC data structure ture extracted from ge_interface.h. Within the GRAPH_DESC data structure, the background checker provides several references to the prototype levels just discussed, starting with the current operator being identified by cur_op_name and cur_op_num. From this starting point, all children are readily available through the data flow diagram. However, the parent can not be derived from the current operator. The background checker provides a reference to both the parent_op_name and parent_op_num, as well as the root, root_op_name and root_op_num.

The current operator's specification is supported using several symbols. The cur_op_spec provides the PSDL code. The specification construct must be derived by the background checker. The input and output constructs are derived from the parent operator's data flow diagram. This was seen in Figure 19, where the input and output streams of operator d could be derived from the data flow diagram of the parent operator, operator b. In this case, streams x and s were the input streams and z was the output stream. In order to minimize the PSDL syntactical knowledge required by the graph editor, the background checker provides a partial parsing of the operator's specification. The operator's input stream list, input_list, output stream list, output_list, and maximum execution time, cur_op_spec_met and cur_op_spec_met_unit, are all provided as objects which can be operated on by the graph editor. Note that a portion of the current operator's specification is dependent upon the current operator's implementation. For example, the list of states provided in the specification are derived from the current data flow diagram. For such cases, the PSDL code provided in cur_op_spec is not maintained while in the graph editor. The background checker will update these constructs as requested.

The current operator's implementation is composed of several objects. The majority of the operator's implementation is provided in the data flow diagram. In addition, a list of timers, timer_list, and the data flow diagram's informal descrip-

```
/* typedef for the graph description structure
typedef struct graph_desc_node{
 /* From SDE to GE */
                            /* name of the root operator
 char* root_op_name;
 int root op num:
                            /* unique op_num of the root operator
 char* parent_op_name;
                            /* name of the parent of the current operator */
                            /* unique op_num of the parent operator
 int parent op num:
                            /* name of the current operator
 char* current_op_name;
                                whose dataflow graph is being edited
                             /* unique op_num of the current operator
 int current_op_num;
 /* From SDE to GE */
 ST_LIST input_list;
                             /* list of input streams
 ST_LIST output_list;
                             /* list of output streams
                             /* NOTE: only label, label_font, stream_type_name,
                                state_initial_value, is_state_variable are
                                meaningful in the input_list and output_list */
 /* From SDE to GE */
 int cur_op_spec_met;
                                /* MET is kept separate from the spec
         cur_op_spec_met_unit;  /* interface. Still, only the reqmts can */
 int
 /* MTS 11/25/96
    change cur_op_is_terminator from int to BOOLEAN */
            cur_op_is_terminator;
  /* Bi-directional between SDE and GE */
                                /* Specification of current operator which */
 char* cur_op_spec;
                                 /* is edited with mini-sde.
  /* Bi-directional between SDE and GE */
 OP_LIST operator_list;
 ST_LIST stream_list;
 ID_LIST timer_list;
  char* graph_informal_desc;
  /* From SDE to GE */
  ID_LIST avail_impl_langs;
                                 /* An ID_LIST of available languages from */
                                 /* which an operator can be implemented */
  /* Bi-directional between SDE and GE */
  char* global_types;
                                 /* SDE output of all types
} GRAPH_DESC_NODE, *GRAPH_DESC;
```

Figure 22. GRAPH_DESC Extract

tion, graph_informal_desc, are supported. The operator's data flow diagram is specified by a linked list of operators, operator_list, and a linked list of streams, stream_list.

All abstract data types are provided as PSDL code in global_types. This implementation of the graph editor does not provide graphical user interface support of abstract data types. However, the PSDL code, as derived by the background checker is made available to the graph editor.

Upon returning control back to the background checker, the ge_interface.h data structures are used to update the PSDL prototype components. Primarily, this involves updating the current and child operators. However, global updates of components may be required to maintain consistency with changes introduced in the current operator.

D. PSDL VALIDATION AND GENERATION

The PSDL Editor ensures a syntactically correct prototype. In the CAPS Release 1 PSDL Editor, all of the syntactical knowledge was embedded in the syntax-directed editor. This was appropriate since, other than the data flow diagram, the prototype was edited through the syntax-directed editor. With the focus of this implementation being on the graph editor and the graphical user interface, the prototype is now fully defined from the graph editor. Even with this change of focus, it is still possible to maintain the majority of the syntactical knowledge within the background checker. However, with the editing of the prototype being accomplished in the graph editor and the syntactical verification being performed in the background checker, a time delay is inserted between the entry of the prototype data and the detection of any errors. The length of this time delay is dependent upon how the graph editor and background checker interface. In the CAPS Release 1 PSDL Editor implementation, the syntax-directed editor generated by the Synthesizer Generator performed incremental validation of PSDL syntax as the user typed [Ref. 8]. For this

implementation, the interface between the background checker and the graph editor is accomplished similar to batch processing. In this mode of operation, an operator is edited without assistance from the background checker. Upon the user request to verify the prototype, or upon changing the current operator to another operator, the background checker is called to perform syntax/semantic validation.

There are two categories of errors which are detected by the PSDL Editor: syntactic and semantic. With automatic PSDL code generation by the background checker, syntactical errors are limited to user supplied input. Semantic errors are generally more global, typically involving one or more operators. Typically, semantic errors which are detected are based on a relationship between two symbols. With this distinction between the nature of the two categories of errors, it seemed reasonable to move the detection of syntactical errors to the graph editor, avoiding any delays introduced with a batch mode of operation, while semantic error detection being performed within the background checker. With the current architecture of the background checker and the graph editor, certain semantic errors can only be detected from the background checker, since only the background checker has a global perspective of the prototype.

In addition to the generation of the PSDL constructs associated with user supplied inputs, the PSDL Editor supplies automatic code generation for redundant data. This feature is most apparent in the generation of PSDL code to support both the specification and implementation constructs of an operator.

1. Validation of PSDL Constructs by the Graph Editor

The graphical user interface of the PSDL Editor facilitates the validation of user supplied PSDL constructs. Validation of user inputs are performed prior to updating the graph editor internal data structures. In this manner, all user supplied inputs are validated prior to being relayed back to the background checker. All fundamental PSDL data objects listed in Table IX are validated by the graph editor. Table XII provides the routines and state machines, as applicable, in which the funda-

Table XII. Fundamental PSDL Data Object Validation

PSDL Data Object	Rule	State Machine	Routine
id	41	N/A	valid_id
id list	11	N/A	valid_id, checked individually
operator id	24	Figure 23	valid_op_id
type name	10	Figure 24	valid_type_name
integer literal	43	N/A	valid_integer_literal
text	49	N/A	Motif
enumeration			Motif

mental data objects are validated. Validation routines are found in ge_utilities.c, which is included in Appendix D, starting on page 202. All enumeration values listed in Table X are validated by the graphical user interface by only allowing the user to select one value from a predefined list.

For the complex PSDL data objects listed in Table XI, the graph editor does not contain the syntactical knowledge to validate user supplied input. While required,

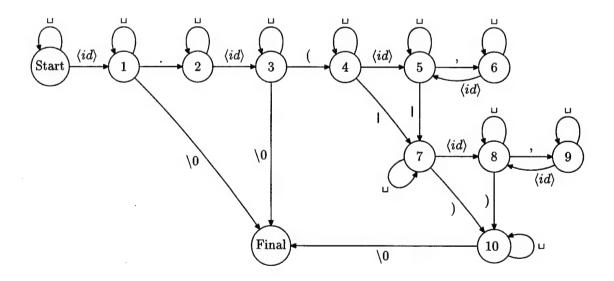


Figure 23. $\langle op_id \rangle$ Validation State Machine

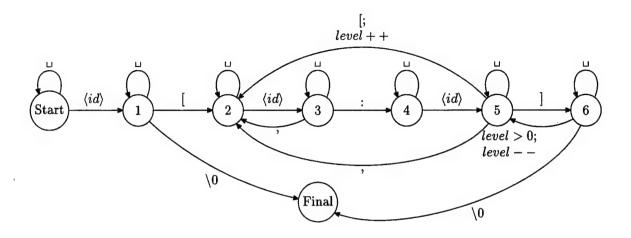


Figure 24. \(\langle type_name \rangle \) Validation State Machine

the facilities needed to provide this validation have yet to be implemented.

2. PSDL Redundant/Derived Data

The operator's specification defines the external interface of the operator while hiding the details of the implementation. The specification provides a "summary" of the operator, and thus contains redundant information found in the operator's implementation. The PSDL Editor provides support for this redundant information. The user is only required to enter data once. The background checker is equipped with the semantic knowledge required to derive the redundant data. In addition to saving the user from entering redundant information, this implementation avoids semantic errors due to inconsistencies between redundant data. If data is entered twice, there is the possibility that it will be inconsistent. If it is only entered once, there is no possibility for inconsistent data.

The graphical user interface designed for the graph editor has been limited to the single entry of redundant data. There is no semantic knowledge regarding redundant data in the graph editor. All redundant data processing is performed by the background checker.

3. PSDL Semantic Consistency by the Graph Editor

While limited by the local scope of a single operator, the graph editor is still capable of enforcing some semantic consistency.

Within the scope of an operator, those operators used to implement the data flow diagram must be unique. Uniqueness of operator labels does not apply to operators of an abstract data type. Uniqueness is enforced upon user entry of the operator label. The routine unique_op_id, found in graph_object_list.C (reference Appendix D, starting on page 277), is used to test for uniqueness.

The characteristic of an operator being implemented as a composite terminator (i.e., having a maximum execution time of zero) is inherited by all operators of the data flow diagram. The graph editor enforces this inheritance by limiting the user to the use of only terminators within the graphical user interface.

Unlike the scoping rules for operator labels, which must be unique for non-type operators within a data flow diagram, multiple uses of a stream are allowed within a data flow diagram. While each operator implements its own type of stream (i.e., data flow stream or sampled stream), streams also contain global characteristics. These include stream type, state stream, and initial value. The graph editor provides for the propagation of these characteristics for all streams within the data flow diagram. It is the requirement of the background checker to maintain consistency of these global characteristics external of the current operator. The graph editor enforces consistency through the routine propagate_stream, found in graph_object_list.C (reference Appendix D, starting on page 277).

With a global perspective, the background checker is capable of providing additional semantic validation. Specifically, the background checker has provisions for validating the input and output streams specifications in a child/parent relationship. As was seen previously in Figure 19, the data flow diagram of the parent operator defines the inputs and outputs to the child operator. When a child operator is implemented with a PSDL network, the external input and output streams present in the

child's data flow diagram must exactly match the input and output streams found in the parent's data flow diagram [Ref. 3]. External input and output streams which were not defined in the parent's data flow diagram are flagged as being illegal by the background checker. Input and output streams defined in the parent's data flow diagram but missing from the child's implementation are flagged as being missing.

In these two cases, it is beyond the capability of the PSDL Editor to determine a corrective action. Instead, upon detecting the error, the background checker provides an error message to the user. Facilities are provided to navigate directly to the parent or child operator in order to correct the problem.

The background checker provides an additional test to warn against a semantic violation. As was previously mentioned in Chapter II, PSDL has no global variables. However, as currently implemented in CAPS Release 1, streams are global, based on the stream name. The background checker tests for the use of global streams and provides a warning on its use.

Figures 25 through 27 provide an example of these error conditions which are detected by the background checker. Figure 25 provides the parent data flow diagram. Figure 26 provides the decomposition of operator b found in the parent's data flow diagram. Figure 27 depicts the resulting error messages from this prototype. In this case, the parent's data flow diagram specifies that operator op_b shall have an input, op_b_in, and an output, op_b_out. Within the implementation of operator op_b, found in Figure 26, two undefined, external streams are specified, called in and out. These two errors are reported as the first two errors in Figure 27. Next, the lack of input op_b_in and output op_b_out from the child's implementation are reported as the next two errors in Figure 27. Finally, the global stream x is defined both in the parent's data flow diagram and the child's data flow diagram, without the stream being passed between the parent and the child. The final two error messages of Figure 27 report this condition.

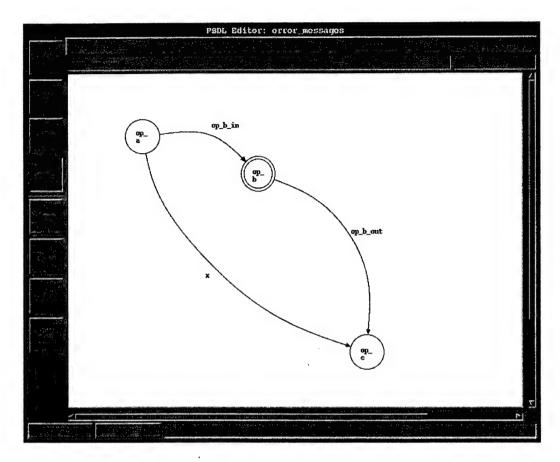


Figure 25. Parent Graph Depicting Errors

E. PSDL SYNTAX CHANGES

Several modifications have been made to the PSDL grammar in support of CAPS Release 2. The new PSDL Editor is required to support these changes. A copy of the CAPS Release 2 PSDL grammar is provided as Appendix A. A few small fixes have been incorporated, such as updates to the $\langle letter \rangle$ and $\langle alpha_numeric \rangle$ production rules. Previously, these rules allowed any number of consecutive underscore characters ('_') in an $\langle id \rangle$. The grammar rules have been changed (reference production rules 47 and 48 in Appendix A) to be consistent with the construct of identifiers in Ada. Another small change was the generalization of the implementation language identifier in the $\langle type_impl \rangle$ and $\langle operator_impl \rangle$ production rules (reference rules 17

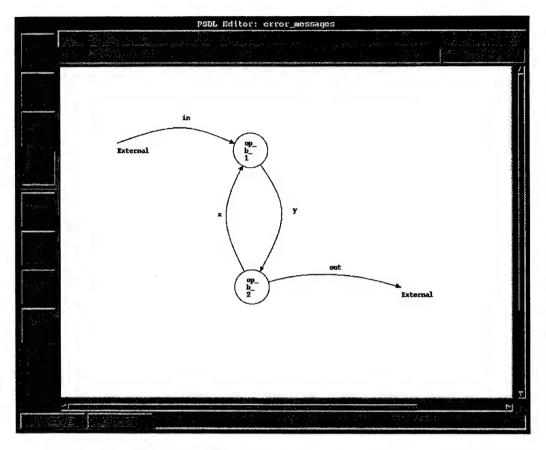


Figure 26. Child Graph Depicting Errors

and 18 in Appendix A). Previously, only Ada was allowed as an implementation²².

Two more substantial changes were made to the PSDL grammar which impact the PSDL Editor. From the standpoint of the user interface, these changes are transparent to the user. However, both require support from the PSDL Editor to implement.

1. PSDL Data Flow Diagram Properties

In CAPS Release 1, the PSDL file generated by the PSDL Editor was sufficient to support the Execution Support tools, yet was not sufficient to support the PSDL

²²Currently, the only supported implementation languages are Ada and TAE. Facilities have been provided in the grammar for future supported languages.

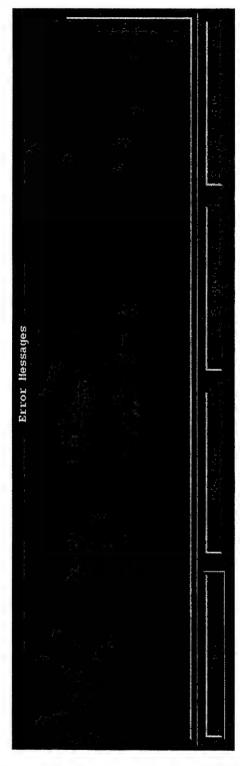


Figure 27. Syntax-Directed Editor Error Messages

Editor. The PSDL Editor provided an additional file, with an extension of ".grf", to facilitate the presentation of the data flow diagram. In CAPS Release 1, the PSDL grammar did not have provisions to capture the full specification of the data flow diagram (i.e., the visual presentation requirements). In CAPS Release 2, the PSDL grammar has been updated with a property construct (reference production rules 21, 22, and 23 in Appendix A) for this purpose. This change provides for the tagging of properties to vertices and edges of a data flow diagram based on predefined identifiers. These properties capture the information which was previously recorded in the ".grf" file. A list of these identifiers was provided in Chapter II as Table VI (page 38). Currently, these properties are only used by the PSDL Editor.

2. Unique Identifier Suffixes in CAPS Release 2

CAPS Release 2 introduced a new semantic convention for the purpose of enforcing PSDL scope rules. Professor Berzins described the conventions used in his email dated 25 July 1996, which has been provided as Appendix C.

The semantics of PSDL requires that the operators within a composite PSDL operator (i.e., an operator which has been implemented with a PSDL network) be local to that operator. The scoping of operators is illustrated in Figure 28, a portion of a PSDL prototype, in which operators fm_a and fm_b both contain operators with common names, x, yet are local to their respective parent operator. However, this only applies to PSDL operators. Scoping for operators of a PSDL type are global, as PSDL types are globally available within the prototype heirarchy. Thus, t.x refers to the same operator of t, from both fm_a and fm_b. Note that within an operator, PSDL operator names must be unique, as was described previously.

In order to implement the PSDL scoping rules, unique integer suffixes are attached to the PSDL operator identifiers, thus ensuring that all PSDL operators are unique. In addition to supporting the scoping rules of PSDL operators, suffixes are also used to support multiple instances of PSDL type operators within the same graph. Thus each operator, both PSDL operators as well as PSDL type operators,

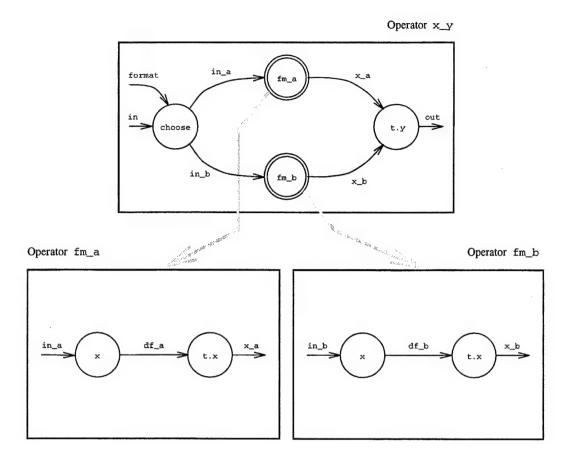


Figure 28. Scope of PSDL Operators

are assigned a vertex number within a data flow diagram. In addition, each PSDL operator is assigned an operator number. The convention is as follows:

```
\langle op\_name \rangle \_ \langle op\_num \rangle \_ \langle vertex\_num \rangle
\langle type\_op\_name \rangle \_ \langle vertex\_num \rangle
```

The above prototype portion is depicted again in Figure 29, in which suffices have been included.

Note that this is actually not a syntax change. The inclusion of operator and vertex number suffixes is within the syntax of an $\langle id \rangle$ (reference production rule 41 in Appendix A). The use of suffixes to implement the PSDL scoping rules is a semantic convention which is used by the CAPS subsystems. The implementation of the suffix

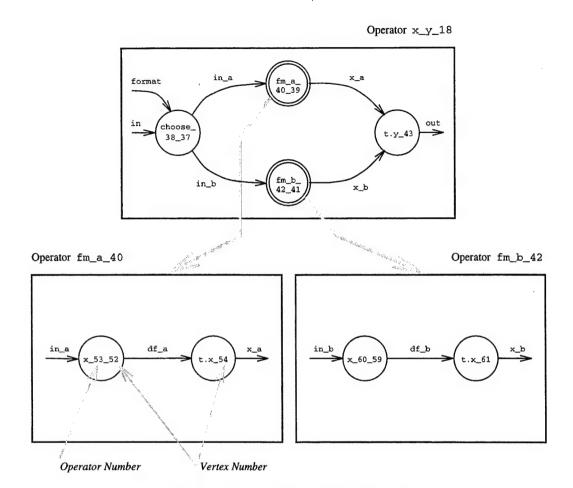


Figure 29. PSDL Operator Suffixes

convention is to be hidden from the PSDL Editor user, thus requiring the PSDL Editor to fully automate its suffix behaviour.

IV. USER-INTERFACE DESIGN

The core of a PSDL prototype is the data flow diagram. In the CAPS Release 1 PSDL Editor, the graph editor was solely used to edit/view the data flow diagram. Following the editing of the data flow diagram, the syntax-directed editor was used to edit all other constructs of the prototype. This release of the PSDL Editor attempts to streamline the editing process of a PSDL prototype by focusing the user interaction to the graph editor.

From an inspection of the PSDL grammar (reference Appendix A), it can be seen that a large number of PSDL constructs can be synthesized by the editor, using simple user provided data objects (e.g., literal values, text strings, identifiers, and list of identifiers). As a PSDL prototype consists of a network of operators connected by streams, the PSDL constructs, and hence the user provided data objects, are all associated with either an operator or a stream. The only exception being abstract data types. Thus, a graphical user interface model was developed, which build upon the earlier data flow diagram effort of the CAPS Release 1 graph editor, with the addition of pop-up windows associated with operators and streams for the entry of user provided data objects.

Complex PSDL constructs (e.g., expressions), as discussed in Chapter III, are associated with operators and streams as well. However, the complexity of these constructs does not lend themselves to a simple synthesis from user provided data objects. As an initial attempt of expanding the graphical interface of the PSDL Editor, the specification of these constructs was maintained in PSDL syntax.

A large portion of the graphical interface produced by Captain Robert Dixon, USMC [Ref. 13], was maintained in this implementation. Primarily, the interface used for the data flow diagram was preserved, with a few enhancements. Expansion of the graphical interface was partially outlined as part of the NPS CS4520 (AY96Q4) class project, implemented by Mr. Douglas Lange and Mr. Dagohoy Anunciado.

Additional modifications and enhancements to the interface were a result of this research.

A. PSDL EDITOR ENVIRONMENT

The graphical user interface provided in CAPS Release 1 (i.e., the graph editor's interface) was built upon the X Window System²³, using the Motif²⁴ widget set. The selection of Motif for use in the CAPS Release 1 PSDL Editor was discussed in Captain Dixon's thesis [Ref. 13]. Motif provides assistance in the development of an application by providing a standard look and behavior to the user interface.

1. PSDL Editor Layout

The PSDL Editor's graphical user interface is designed to facilitate the specification of a PSDL operator. As was discussed previously, the user interface is limited to a single PSDL operator at any given time. The PSDL Editor does not provide for the implementation language (e.g., Ada) editing of an operator.

The PSDL Editor's graphical user interface is depicted in Figure 30. The graphical user interface consists of six areas, which are identified in Figure 30 and discussed in the following paragraphs. Pop-up windows are used to support the specification of constructs directed at streams and operators of a data flow diagram.

a. Main Window

This is the X Window from which the user interacts with the PSDL Editor. The MAIN WINDOW is equipped with a title along with several control widgets on the top bar. The title is composed of "PSDL Editor:" and the name of the prototype. The prototype name is based on the file name (i.e., name of root operator) provided upon execution of the PSDL Editor. If no file name is provided, the title is set to DEFAULT_PROTO_NAME. The operation of the control widgets is based on the X

²³X Window System is a trademark of the X Consortium.

²⁴Motif is a trademark of the Open Software Foundation.

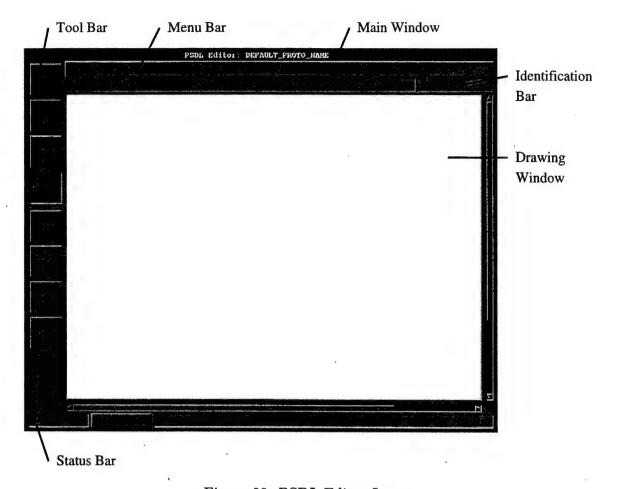


Figure 30. PSDL Editor Layout

Window System initialization. Reference Appendix E for notes on customization of the Main Window.

b. Menu Bar

Pull-down menus provide easy access to PSDL Editor functions. Standard access to the pull-down menus is supported, accomplished using the left-mouse button. Figure 31 depicts all four pull-down menus. Note that the MENU BAR was distorted in the generation of this figure in order to display all four menus simultaneously. Only one menu is available at a time in the PSDL Editor.

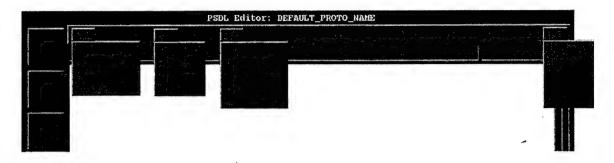


Figure 31. PSDL Editor Menus

c. Tool Bar

The TOOL BAR is divided into two areas by a horizontal line. Above the line, buttons are provided to access tools for "drawing" the data flow diagram. Below the line, buttons are provided to access functions for editing several PSDL constructs. The functions provided here are relative to the current operator or are global in nature (e.g., the function Types is directed towards abstract data types). As will be seen later, other functions, available through pop-up windows, are relative to the operators and streams contained in the data flow diagram. The functions here (i.e., Spec, Timers, and Graph Desc) are directed to the operator indicated in the Identification Bar.

The selected drawing tool, above the horizontal line, is independent of any tool selected below the horizontal line. While drawing functions are not active during the use of a tool below the horizontal line, upon exiting, the previously selected drawing tool remains in effect until another drawing tool is selected.

d. Identification Bar

The IDENTIFICATION BAR provides the name of the current operator (left data window) as well as the maximum execution time of the current operator (right data window). These values can not be modified at this level. Instead, the user is required to change the values from the parent operator's data flow diagram. The values displayed from the root operator can not be changed.

e. Drawing Window

This area is used to display/edit the data flow diagram. Scroll bars are provided as necessary to view the entire data flow diagram window. Beyond the area accessed through the window scroll controls, the Drawing Window can not be enlarged. If a larger drawing area is required, consider decomposing operators.

f. Status Bar

The STATUS BAR provides feedback to the user. Divided into three windows, the STATUS BAR provides: (1) an indication that the prototype has been modified (SAVE REQUIRED versus SAVE NOT REQUIRED), (2) an indication that the prototype's syntax should be verified (CHECK SYNTAX versus ERROR MSGS), and (3) a window for displaying status and error messages.

The first two indicators are button widgets. The labels on the buttons are changed as required to provide feedback. Activation of the button provides a short cut to the desired function (i.e., save the prototype, perform a syntax check, and display any error messages). The last indicator provides an area to provide editor feedback. Typically, an information pop-up window is used to display an editor message. This window is used to remind the user after the pop-up window has been acknowledged. The window is automatically erased, typically on the next operation.

2. Component Identification

From the Main Window, the user can access an Operator Property or Stream Property pop-up window. This is accomplished by positioning the cursor over an object in the Drawing Window and pressing the right-mouse button. The appropriate pop-up window will be accessed. Figures 32 through 34 provide an example of the these three windows. Component²⁵ Identification numbers are provided, which reference into Table XIII (Index), providing identification of all displays/controls.

 $^{^{25}}$ In this case, component refers to a Motif widget and not to a PSDL component.

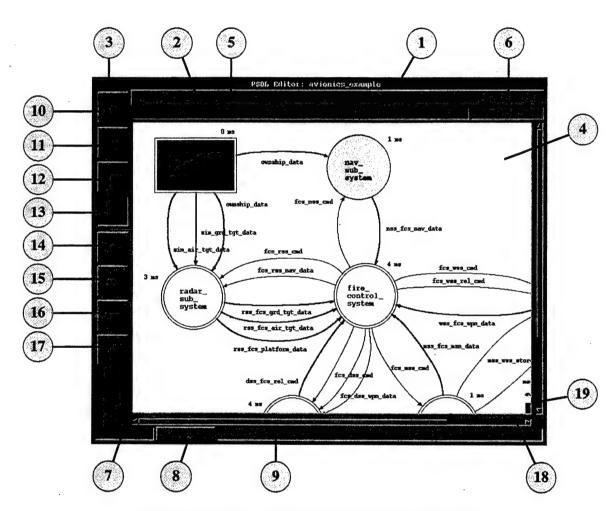


Figure 32. PSDL Editor Component Identification

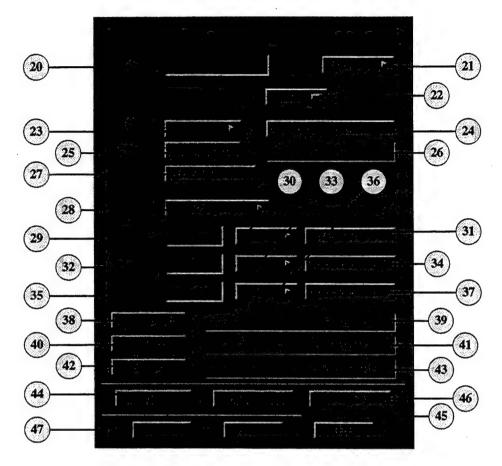


Figure 33. PSDL Editor Operator Pop-up Component Identification

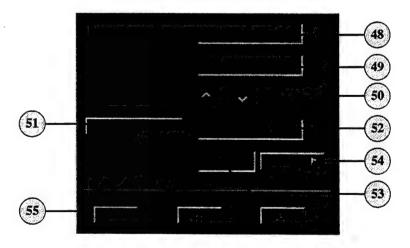


Figure 34. PSDL Editor Stream Pop-up Component Identification

Table XIII.: PSDL Editor Component Identification

Hides Validation	N/A	N/A	N/A	valid_op_id, unique_op_id,	valid_id	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Validated	Not Validated	valid_id	Motif	N/A	N/A
Indicator	N/A	N/A	N/A	Drawing		Data	Data	Label	Label	Data	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Component Type	Display Only	Control	Control	Data Flow Diagram		Display Only	Display Only	Control	Control	Display Only	Control	Control	Control	Control	Control-Text	Control-Text	Control-IdList	Control-Text	Control	Control
Identification	Prototype Name	Menu Bar	Tool Bar	Drawing Window		Current Operator Name	Current Operator MET	Save Button/Indicator	Check Syntax Button/Indicator	Status Message Window	DFD Operator Tool	DFD Terminator Tool	DFD Stream Tool	DFD Select Tool	Types Tool	Specification Tool	Timers Tool	Graph Informal Description Tool	DFD Horizontal Scroll Control	DFD Vertical Scroll Control
Index	-	2	က	4		2	9	7	8	6	10	11	12	13	14	15	16	17	18	19
Window	Main																			

Table XIII.: PSDL Editor Component Identification

Operator 20 Operator Name 21 Operator/Terminator Selection 22 Implementation Language 23 Trigger 24 Trigger Identifier List 25 Trigger Id Condition 26 Trigger Id Condition 27 Trigger Required By 28 Timing 29 MET Value 30 MET Required By 31 MET Required By 32 MCP/Period Value 33 MCP/Period Within Value 34 MCP/Period Required By 35 MRT/Finish Within Value 36 MRT/Finish Within Units 37 MRT/Finish Within Beauired By	Data Entry Select Select Select Control-IdList Control-Text	Data		
				valid_op_id, unique_op_id
	Select Select Control-IdList Control-Text	Enumeration		Motif
	Select Control-IdList Control-Text	Enumeration		Motif
	Control-IdList Control-Text	Enumeration		Motif
	Control-Text	Data	Yes	valid_id
		N/A		Not Validated
	n Display Only	Data	Yes	N/A
	Control-IdList	Label		valid_id
	Select	Enumeration		Motif
	Data Entry	Data	Yes	valid_integer_literal
	Select	Enumeration	Yes	Motif
	Control-IdList	Label	Yes	valid_id
	Data Entry	Data	Yes	valid_integer_literal
	Select	Enumeration	Yes	Motif
	Control-IdList	Label	Yes	valid_id
	Data Entry	Data	Yes	valid_integer_literal
	Select	Enumeration	Yes	Motif
	3y Control-IdList	Label	Yes	valid_id
38 Output Guard Control	Control-Text	N/A		Not Validated
39 Output Guard Display	Display Only	Data	Yes	N/A

Table XIII.: PSDL Editor Component Identification

Window	Index	Identification	Component Type	Indicator	Hides	Validation
	40	Exceptions Control	Control-Text	N/A		Not Validated
	41	Exceptions Display	Display Only	Data	Yes	N/A
•	42	Timer Operation Control	Control-Text	N/A		Not Validated
	43	Timer Operation Display	Display Only	Data	Yes	N/A
	44	Keywords	Control-IdList	Label		valid id
	45	Informal Description	Control-Text	Label		Motif
	46	Formal Description	Control-Text	Label		Motif
	47	Exit Controls	Control	N/A		N/A
Stream	48	Stream Name	Data Entry	Data		valid id
	49	Stream Type	Data Entry	Data		valid_type_name
	20	State Stream Selection	Select	Enumeration		Motif
	51	State Initial Value Control	Control-Text	N/A	Yes	Not Validated
	52	State Initial Value Display	Display Only	Data	Yes	N/A
	53	Latency Value	Data Entry	Data		valid_integer_literal
	54	Latency Units	Select	Enumeration	:	Motif
	55	Exit Control	Control	N/A		N/A

3. Types of Components

Under the Component Type column of Table XIII, the various types of user interaction are identified. The PSDL Editor utilizes a limited set of widgets to interact with the user. These components are used both for editing a data object as well as viewing a data object. Typically there is not sufficient space within a window to view all of a data type. Controls are used to access additional Motif widgets from which the entire data object can be viewed/edited. In most cases, an indication is provided that additional information is available through a pop-up window.

The data flow diagram requires significant interaction. It will be discussed in another section.

a. Display Only

This widget provides no input/control functionality. It is only used to display data. Data may be obtained from the editor and displayed, as is the case for the Current Operator Name (Index 5). Alternatively, the input may be provided by the editor, but accessed from a control button, as in the case of Trigger Id Condition Expression (Index 26) which is accessed from the Trigger If Condition (Index 25).

b. Data Entry

This widget provides direct data entry through the keyboard. Prior to data entry, ensure that the mouse cursor is positioned within the Data Entry window. The user can scroll through the Data Entry window using the left and right arrow keys, as required.

c. Select

This widget provides a select-one-of function. Values act similar to an enumeration type. Values are predefined and only one value can be selected. The Select type may be either a radio widget, such as State Stream Selection (Index 50), or a pull-down version, such as Implementation Language (Index 22). The pull-down version is activated by depressing and holding the left-mouse button over the component. Move the cursor over the desired value and release the mouse button. An example of the Implementation Language widget is provided in Figure 35. Note

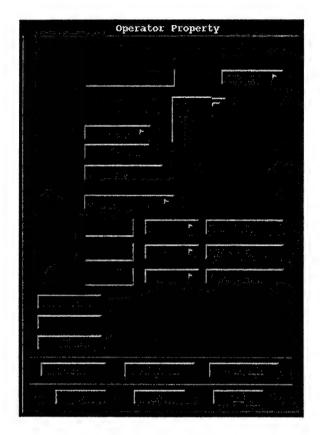


Figure 35. Select Component

that, in this example, the cursor is not visible.

d. Control

Control widgets are accessed by depressing the left-mouse button over the component.

e. Control-Text

Control-Text components access a pop-up Text window. An example of a Text Window is provided in Figure 36, in which the prototype's abstract data types were accessed through the TYPES TOOL (Index 14).

Within the Text Window, the user can position the cursor with the mouse and edit the text. The cursor must remain within the Text Window while editing the text. Scroll bars are provided for moving through the text. Initially, all changes made within the Text Window are local to the Text Window. In order

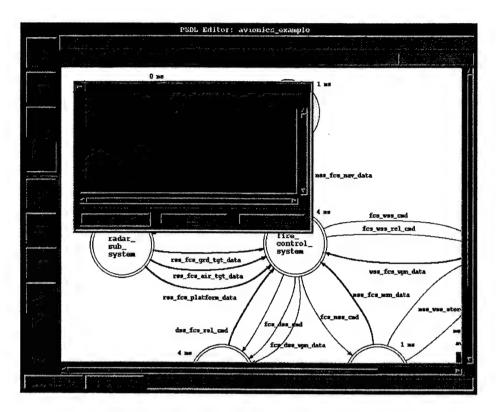


Figure 36. Text Window Component

to modify the prototype, the changes must be accepted. This is accomplished by depressing the OK button. Changes may be aborted by depressing the CANCEL button.

f. Control-IdList

Control-IdList components access a pop-up identifier list editor. Within this window, a list of identifiers may be viewed/edited. An example of an Id List Window is provided in Figure 37, in which the operator's Timer list is accessed through the Timers Tool (Index 16).

From the Id List Window, the identifier list can be viewed directly. In order to add an identifier, the Add button is depressed. A pop-up window is provided to add the identifier to the list. The new identifier is accepted locally through the OK button. The addition of an identifier to the Id List is depicted in Figure 38. A similar

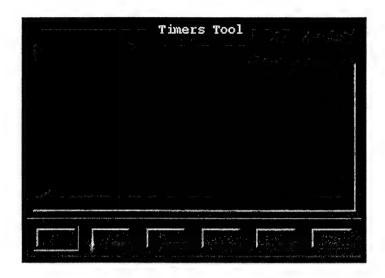


Figure 37. Identifier List Editor Component

process applies to the editing of an existing identifier. However, in the case of editing an identifier, the identifier must first be selected. Otherwise an information message will be displayed to select an identifier first. In order to delete an identifier from the list, select the identifier and depress Delete. Again, an information message will be displayed if an identifier is not first selected.

Like the Text Window, initially, all changes made within the Id List Window are local. In order to modify the prototype, the changes must be accepted. This is accomplished by depressing the OK button. Changes may be aborted by depressing the Cancel button.

4. Display Indications

Under the Indicator column of Table XIII, the various methods used to display data are identified. Where practical, data objects are displayed within the window. However, due to the limited space within a window, it is not always possible to display the entire value of a data object. An effort was made to indicate to the user where data is available. This is not universal, in that the tool buttons have no indication of the existence of data.

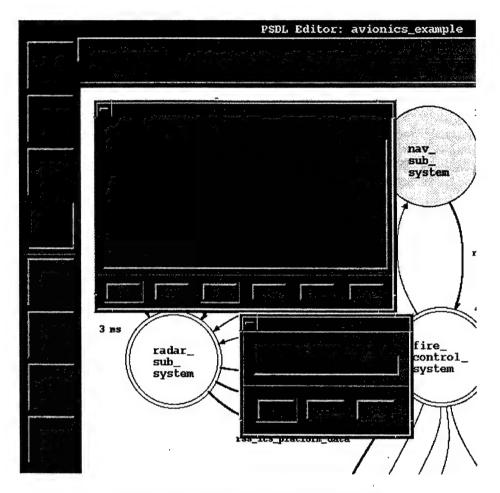


Figure 38. Adding to an Identifier List

As for the data flow diagram, it is visible in the Drawing Window. However, in order to view all attributes of the data flow diagram, the stream and operator popup windows must be accessed. The only method available to view the entire prototype is through the PSDL code generated by the PSDL Editor.

a. Data

A Data indication can be viewed directly from its Data or Display Only component. The user can scroll within the data window through the use of the left and right arrow keys.

b. Data...

The Data... indication is similar to the Data indicator. However, in this case, the data value is typically much larger than the display window. If the data value will not fit within the window, the data value is truncated and a set of epsilons (i.e., "...") is appended. Use the control mechanism to access the entire data value.

$c. \quad Enumeration$

The current Enumeration value is indicated directly on the control component.

d. Label

A Label indication is similar to an Enumeration indication in that any feedback is provided directly on the control component.

$e. \quad Label...$

In this case, much like the Data... indication, a set of epsilons (i.e., "...") is appended to the label to indicate that a data value is associated with the control component. Without the epsilons, a value has not yet been assigned.

f. Hidden

Not all data objects are available in all situations. Some data objects are context depended. For example, a state stream initial value is not relevant unless the stream is a state stream. As a method of enforcing PSDL semantics, several components are displayed based on the context of the operator/stream. The Hides column of Table XIII indicates those components which may be unavailable due to context. Figure 39 depicts the case of a stream which is not a state stream. Here, the State Initial Value Control (Index 51) is "grayed out" and the State Initial Value Display (Index 52) have been removed. In contrast, Figure 34 depicts a state stream in which both of these components are available.

5. Cursor Types

Several different types of cursors are used within the PSDL Editor. The default cursor is the left pointer. It is used for selecting components as described above. Within the Drawing Window, an I-Bar cursor is displayed when the cursor is over

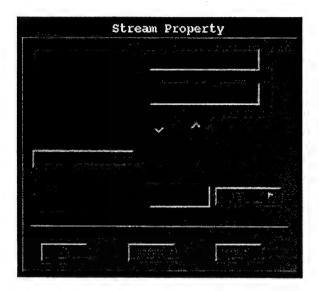


Figure 39. Hidden Components

an object (i.e., data stream or operator). The I-Bar cursor over the data flow diagram is used to indicate to the user that a label can be typed in directly. Finally, a clock face cursor is used to indicate that the PSDL Editor is busy. The clock face cursor is typically encountered when a syntax check or a prototype save function is performed. More will be said regarding the I-Bar cursor in the Data Flow Diagram paragraph below.

6. Mouse Interface

The PSDL Editor requires a two button mouse. The left-mouse button is used to access most functions. The right-mouse button is used to pull up the Stream Property or Operator Property pop-up window, as required. This is accomplished by placing the cursor over the object in question within the DRAWING WINDOW and depressing the right-mouse button. Again, more will be said about mouse interaction in the Data Flow Diagram paragraph below.

Table XIV. PSDL Editor Hot Keys

Function	Menu	Control-key	Diamond-key
Go то Rоот	PSDL	CTRL-R	♦-R
GO TO PARENT	PSDL	CTRL-P	◊-P
DECOMPOSE	PSDL	CTRL-D	\$- D
REFRESH DISPLAY	EDIT	CTRL-F	\$-F

7. Hot Keys

Access to selected menu functions is available through Hot Keys. Those menu items with Hot Keys are identified by an underscore under the Hot Key letter in the pull-down menu (reference Figure 31). Table XIV lists the menu functions, along with the associated key sequence, which are defined Hot Keys.

B. PSDL MAPPING

As was discussed in Chapter III, the PSDL Editor focuses the user on one operator at a time. Figure 40, similar to Figure 21 from Chapter III, indicates the general mapping of the PSDL Editor into the prototype. The PSDL graphical user interface focuses the user on the current operator. There are two exceptions, the TYPES TOOL provides for the specification of abstract data types, at the root level, and the Operator Properties pop-up window supports the functionality of child operators. The background checker provides for the generation of redundant code in order to complete the operator's specification construct.

C. PSDL EDITOR OPERATION

The PSDL Editor is operated through the use of MENU and TOOL BAR functions and pop-up windows. Upon creating a new prototype, the user must start at the root level. Abstract data types may be entered through the TYPES TOOL at any time. However, the specification of the hierarchical tree used to implement the prototype must be performed top-down. That is, the structure of the hierarchical

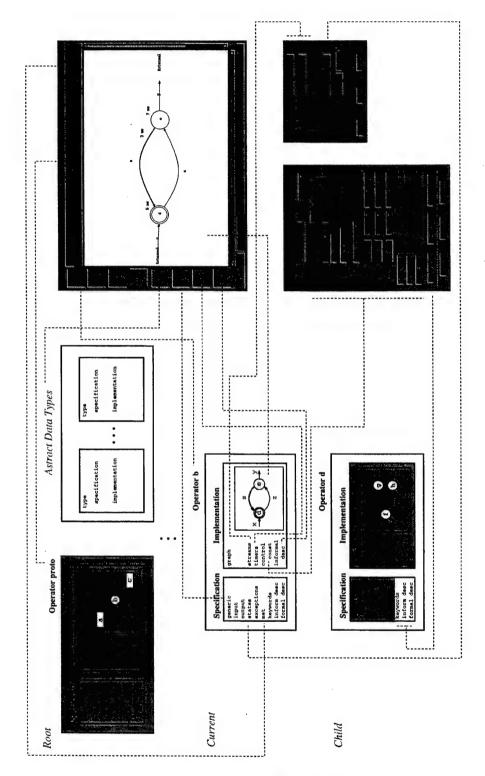


Figure 40. Editor to PSDL Mapping

tree must be specified, starting with the root and proceeding down to the leaves. Development of the prototype in this top-down fashion maintains a syntactically correct prototype. If a bottom-up approach was provided, the prototype would no longer be syntactically correct at each stage of development. The detailed implementation of each operator can be specified in any order.

The network used to implement each PSDL operator is specified within the DRAWING WINDOW, using the tools provided in the TOOL BAR. Implementation details for each composite operator and stream can be entered through pop-up properties windows. Navigation tools are provided to traverse the hierarchical tree. Any time you are using an editor, frequent saves are recommended, which may be accessed through the Menu Bar.

Finally, if help is needed, the PSDL Editor provides help windows, both at the Main Window as well as for pop-up windows. Help is accessed through a text window, as illustrated in Figure 41, with scroll bars available for browsing the message. Press the OK button to exit help.

1. PSDL Editor Segment Synchronization

The PSDL Editor consists of two segments, the background checker and the graph editor, which operate in unison. Each segment performs a portion of the editing task. The background checker is responsible for the input parsing of the PSDL prototype, extracting operators out of the prototype for processing by the graph editor, global syntax and semantic validation, and the generation of PSDL code. The graph editor is responsible for providing a graphical user interface which is used to edit/view the prototype, one operator at a time. The entire prototype is maintained within the background checker. At most one operator can be processed by the graph editor at a time. It is the responsibility of the background checker to accept the operator inputs from the graph editor and to assemble them into a prototype. User directed changes to the prototype are introduced in the graph editor. The background checker automatically resolves the implications of the graph editor produced changes

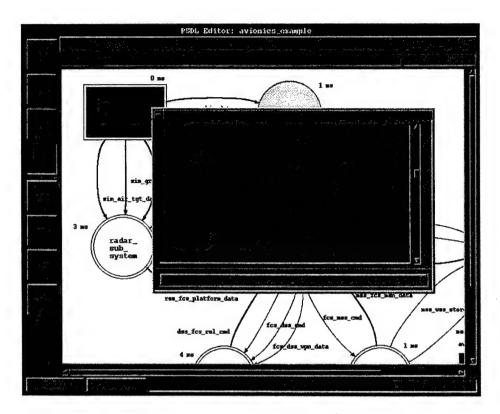


Figure 41. Help Windows

with the prototype. In the event that a discrepancy can not be resolved, an error message is fed back to the user.

The flow of information between the two PSDL Editor segments was depicted in Figure 17 of Chapter III (see page 43). After processing of the prototype, the background checker passes control, along with those objects described in ge_interface.h (reference Appendix D, page 195), to the graph editor. At which point the user is allowed to edit the current operator. All editing of an operator is local to the graph editor. Specific events, requested by the user, result in control being passed back to the background checker. During these events, the background checker synchronizes the prototype with respect to the graph editor. Synchronization is controlled by the ACTION data structure of ge_interface.h. The ACTION data structure also specifies if control is to be returned to the graph editor along with the next operator to be

Table XV. Synchronization Events and Actions

Button/Option	Located on	Action
CHECK SYNTAX button	STATUS BAR	CHECK_SYNTAX
SAVE REQUIRED button	STATUS BAR	SAVE_TO_DISK
SAVE option	FILE MENU	SAVE_TO_DISK
RESTORE FROM SAVE option	FILE MENU	REVERT
EXIT option	FILE MENU	SAVE_TO_DISK or ABANDON
SYNTAX CHECK option	PSDL MENU	CHECK_SYNTAX
Go то Root option	PSDL MENU	UPDATE_TREE
GO TO PARENT option	PSDL MENU	UPDATE_TREE
DECOMPOSE option	PSDL MENU	UPDATE_TREE
ABANDON CHANGES option	EDIT MENU	ABANDON

processed.

The users requested events which result in the synchronization of the background checker and the graph editor are listed in Table XV. Associated with each synchronization event, is an action. Actions are also defined in ge_interface.h.

- •UPDATE_TREE synchronizes the graph editor operator with the prototype maintained by the background checker. No validation is performed.
- •CHECK_SYNTAX synchronizes the graph editor operator with the prototype maintained by the background checker. Syntax and semantic validation is performed.
- •SAVE_TO_DISK synchronizes the graph editor operator with the prototype maintained by the background checker. Syntax and semantic validation is performed. The prototype is saved to a file.
- •REVERT synchronizes the graph editor with the prototype version which resides on disk (i.e., version that was last saved).
- •ABANDON synchronizes the graph editor with the prototype residing in the background checker memory. Only changes made since the last time the prototype was synchronized are abandoned.

2. Data Flow Diagram

The data flow diagram is specified in the DRAWING WINDOW. The PSDL Editor provides a simple drawing package, used to create/maintain the data flow

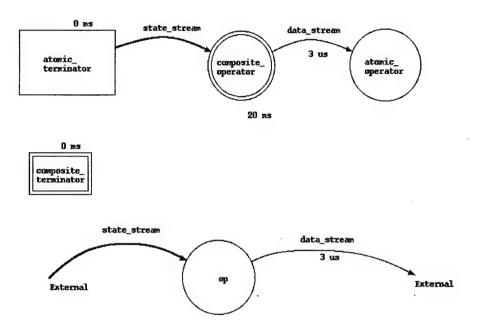


Figure 42. Data Flow Diagram Symbols

diagram. Only a small set of drawing objects are required to represent the data flow diagram. Several variations to objects, such as color and font, are provided to improve the readability of the data flow diagram. These variations have no effect on the operation of the prototype, only on the visual representation of the data flow diagram.

a. Symbols

The data flow diagram consists of a network of operators, connected through streams. Operators and streams are the only objects which are represented in the data flow diagram. Figure 42 depicts all of the symbols which are available to the user.

Chapter II introduced the distinction between operators which are considered to be part of the prototype system and those which reside outside the system. Those operators which reside outside the prototype system partition were specified by assigning a maximum execution time of zero and were called Terminators. Within

the PSDL Editor, Terminators are symbolized by rectangles. All other operators are symbolized by circles. Each PSDL Operator, including Terminators, can be implemented either as a composite operator or as an atomic operator. Atomic operators being implemented using a PSDL supported programming language, composite operators being implemented themselves by a network of PSDL operators. All composite operators are designated by a double boarder in the PSDL Editor, a double rectangle for composite terminators and a double circle for composite operators. In addition to the operator symbol, the data flow diagram is annotated with the operator name and the maximum execution time, as available.

Chapter II also introduced the distinction between streams and state streams. Streams are symbolized by a directed line, state streams by a wider directed line. In both cases, the direction of information flow is indicated by the arrow. Streams and state streams are again annotated with the stream name along with any latency value, as available.

The bottom of Figure 42 depicts the implementation of a composite operator. Streams into and out of a composite operator become external streams within the composite operator's implementation. Such streams are designated with a source or destination of External. Once again, the direction of information flow is indicated by the arrow.

b. Drawing

The data flow diagram is created by selecting a drawing tool from the Tool Bar and positioning the object in the Drawing Window. The drawing tool, once selected, remains selected until another drawing tool is picked by the user. This allows the user to position as many copies of that object in the Drawing Window as desired. Specifically, the following procedures are used create the data flow diagram.

•Operators are added by first depressing and releasing the left-mouse button over the desired Operator/Terminator Tool to select the tool. Then, positioning the cursor over the desired operator/terminator location and depressing and releasing the left-mouse button. Repeat for additional operators/terminators.

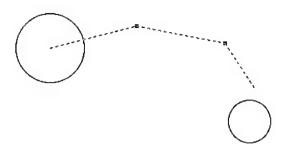


Figure 43. Construction of a Stream

- •Streams are added by first depressing and releasing the left-mouse button over the STREAM TOOL to select the tool. Streams, unlike operators, are created with a sequence of points. At least two points are required to establish a source and destination. Other points can be added to route the stream around other objects on the Drawing Window. The stream source is always the first point selected. The stream destination is always the last point selected. Start the stream by positioning the cursor over the source operator and depressing and releasing the left-mouse button. Streams start and finish at the middle of an operator. There is no need to precisely position the cursor when selecting the source or destination. Route the stream using intermediate points by depressing and releasing the left-mouse button over each location. As the stream is built, it is represented with dashed line segments between anchor points. Anchor points are represented as small black squares, indicating an intermediate point. A stream under construction is depicted in Figure 43. The stream is finalized by positioning the cursor over the destination operator and depressing and releasing the left-mouse button. The resulting stream is a smooth curved line with an arrow at the destination, as depicted in Figure 44. There is no requirement to provide intermediate points within a stream. However, the PSDL Editor does not provide for the addition of intermediate points to a completed stream. Instead, the stream must be deleted and replaced. It is recommended that streams incorporate at least one intermediate point to provide for future routing changes.
- •For composite operators, other than the root operator, inputs and outputs of the composite operator are represented as externals within the data flow diagram. External streams are similar to the streams above, except that they are missing either a source or destination operator. For an external source, position the cursor over the desired "source" location and depress and release the left-mouse button. Continue the stream as discussed above. For an ex-

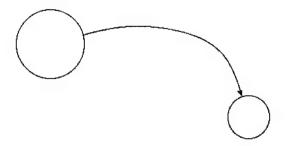


Figure 44. Completed Stream

ternal destination, start the stream as discussed above. In order to complete the stream, position the cursor over the desired "destination" location and double-depress and release the left-mouse button. Care must be taken that the mouse does not move during the double button press. Otherwise, additional intermediate points will be created. The completed external stream is as represented in Figure 42.

- •It the user chooses to abort a stream while in the construction process, the Escape (Esc) can be used to cancel a stream up until completion.
- •Stream and operator labels can be added directly from the Drawing Window. Position the cursor over the object which is to be labeled. Once over the object, the left pointer cursor will be replaced with an I-Bar cursor. At this point, the user can type the label. The label must correspond to a valid identifier for the object. If the cursor is moved during the process of typing the label, the PSDL Editor will assume that you are restarting the label and erase the what has been entered.
- •At any time, depressing and releasing the right-mouse button over an object will access the appropriate pop-up window. After entering the desired data into the pop-up window, depress the OK to accept the data.
- •In order to create a composite operator, the operator must first be selected. This is accomplished by positioning the cursor over the SELECT TOOL and depressing and releasing the left-mouse button. Next, position the cursor over the desired operator and depress and release the left-mouse button to select. The data flow diagram for the composite operator can then be accessed by selecting the DECOMPOSE option from the PSDL MENU.
- •Several of the PSDL Editor functions require the selection of an object. An object is selected through the use of the SELECT TOOL, which is activated by



Figure 45. Selected Operator

depressing and releasing the left-mouse button while the cursor is located over the Select Tool. Objects can then be selected by locating the cursor over the desired object and depressing and releasing the left-mouse button. As an indication that an object has been selected, the anchor points for that object are displayed, as illustrated in Figure 45.

- •In order to deselect an object, depress and release the left-mouse button over any white space in the DRAWING WINDOW.
- •Both operators and streams can be deleted from the data flow diagram. The procedure is the same for both operators and streams. Using the selection procedure described above, select the desired object. The object can then be deleted by the Delete key from the keyboard. If an operator is deleted, then all associated streams will also be deleted. If a stream is deleted, only that stream will be deleted.
- •The PSDL Editor provides the facility to undelete an operator. The undelete operator feature is selected from the EDIT MENU. Selecting this feature access a pop-up window which contains the names of all deleted operators. Undelete the desired operator by locating the cursor over the operator name and double-depress the left-mouse button. This operation can be somewhat confusing in the event that un-named operators are deleted. Such operators show up in the names of deleted operators as a blank lines. However, the same procedure still applies. When an operator is recovered, all associated streams are also recovered. Recovery of deleted operators is available from the time the operator is deleted up until the time that the graph editor passes control back to the background checker. Once control is passed back to the background checker, all deleted operators are purged. If deleted operators are being maintained by the PSDL Editor when control is passed back to the background checker, the user is required to acknowledge that the deleted operators, together with the corresponding portions of the hierarchical tree which resides under the deleted

operators, will be purged. The user can select OK to purge or the user can remain in the graph editor by selecting No or CANCEL.

•The PSDL Editor also provides the facility to abandon all the changes made to the PSDL operator since the last time the operator was synchronized with the prototype. This feature is accessed under the EDIT MENU with the ABANDON CHANGES option.

c. Graph Modifications

Once the data flow diagram has been defined, there are several aspects of the diagram which can be modified to improve the readability of the diagram. These changes have no effect on the performance of the prototype, only on the visual representation of the data flow diagram.

- •Operators can be moved within the Drawing Window. The movement of graphics objects can only be accomplished when the Select Tool is active, as described in the previous section. Using the Select Tool, position the cursor over the desired operator. Depress and hold the left-mouse button. With the left-mouse button held, move the cursor to the desired location and release the left-mouse button. Labels will be moved with respect to the new operator location. Streams paths will be altered as one of the end points is relocated with the operator. None of the intermediate anchor points associated with a stream are moved.
- •Streams paths can also be changed in a similar manner. Select the desired stream, as previously described, to access the stream anchor points. Still using the STREAM TOOL, position the cursor over the desired anchor point and depress and hold the left-mouse button. With the left-mouse button held, move the cursor to the desired location and release the left-mouse button. The location of stream labels will be effected by the new location of the stream mid-point.
- •The size of an operator can likewise be changed through the use of anchor points. Select the desired operator using the SELECT TOOL. Position the cursor over the anchor point, which is in the direction in which you wish to change the operator's size, and depress and hold the left-mouse button. With the left-mouse button held, move the cursor to the desired location and release the left-mouse button.
- •All labels, both names and time values, can be relocated on the DRAWING WINDOW. The label must be selected as previously discussed. Depress and hold the left-mouse button with the cursor over the desired label. Position the

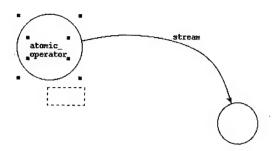


Figure 46. Relocating Operator Label

cursor over the desired location and release the left-mouse button, as depicted in Figure 46.

- •If, in attempting to reposition a stream intermediate point or an operator, one of the associated labels is moved instead, make sure that the label is deselected prior to attempting to move the cursor. This may involve deselecting and reselecting the object.
- •As an aid to increase the readability of the data flow diagram, operators can be colored. Selecting Color from the Edit Menu access a color pop-up window. This function can be utilized in two ways. First, the color of a specific operator can be changed by selecting the desired operator and then assigning a color from the color pop-up window. Second, the color to be used for future operators can be defined by deselecting all operators before accessing the color pop-up window and then selecting a color.
- •Fonts can likewise be changed from the Font option of the Edit Menu. Selecting the Font menu option access a font pop-up window very similar to the color pop-up window. The same two methods of operation for Color apply to Font. First, the font of a specific label can be changed by selecting the label prior to accessing the font pop-up window. Second, the font to be used for future labels can be defined by deselecting all objects before accessing the font pop-up window and then selecting a font. Note that this second mode of operation can not be used to change the font of an existing label by typing over the label with a new font. Instead, the font must be changed using the first method of operation.

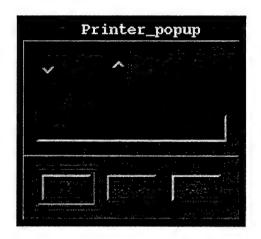


Figure 47. Printer Pop-up Window

d. Printing the Data Flow Diagram

The current data flow diagram can be saved as an output image. This capability is accessed through the PRINT option of the FILE MENU, which presents a printer pop-up window (reference Figure 47). From the printer pop-up window, the image can be saved either to the printer or a file. If file is selected, the user can provide an optional printer name. Only the printer name should be provided in the data window. If no printer name is provided, the image is printed to the standard 1pr printer. The printer must be a PostScript²⁶ printer. If an output file is selected, the data flow diagram is saved to a file using xwd, which produces an X Window System Dump File format. The file name must be provided.

3. Navigation

The graph editor is only capable of displaying/editing the data flow diagram of one PSDL operator at a time. Each prototype consists of a hierarchical tree of PSDL operators. The PSDL Editor provides facilities to traverse the hierarchical tree in order that the entire prototype can be viewed/edited. The mechanism to traverse the prototype is provided within the PSDL MENU. The options DECOMPOSE and GO

²⁶PostScript is a trademark of Adobe Systems Incorporated

TO PARENT are used to traverse up and down the hierarchical tree. Which branch of the tree is traversed, when going "down" the tree, is controlled by the operator which is selected in the data flow diagram. There is only one parent, and thus no option when traveling "up" the tree. A short cut, Go to Root, is provided to directly traverse to the root operator. All navigation menu items are equipped with a hot key to improve efficiency. Hot keys were identified in Table XIV.

4. File Operations

The PSDL Editor provides very simple file operations. Since the PSDL Editor is designed to work within the CAPS environment, there are no provisions for creating a new prototype or saving the current prototype under a different name. The PSDL Editor provides two basic functions, which are located under the FILE MENU: SAVE and RESTORE FROM SAVE. A short cut button, labeled SAVE REQUIRED, is provided on the STATUS BAR. This button is context sensitive to the status of the prototype. If the prototype has not been modified, the button is labeled SAVE NOT REQUIRED. SAVE does just that, saves the prototype to disk. RESTORE FROM SAVE abandons all changes made to the prototype since the last save operation and reverts back to the last saved version. The user will be required to acknowledge that all changes will be lost. Upon completion of the restore operation, the user is returned to the root operator. The save operation will return the user to the original PSDL operator.

The user exits the editor from the FILE MENU using the EXIT option. If required, the user will be prompted to save the prototype. In addition, the user will be informed that all deleted operators will be purged.

Instead of abandoning all changes made to the prototype since the last save command, the user can abandon the changes made to an operator since the last time the operator was synchronized with the prototype. The Abandon Changes option is available under the Edit Menu for this purpose.

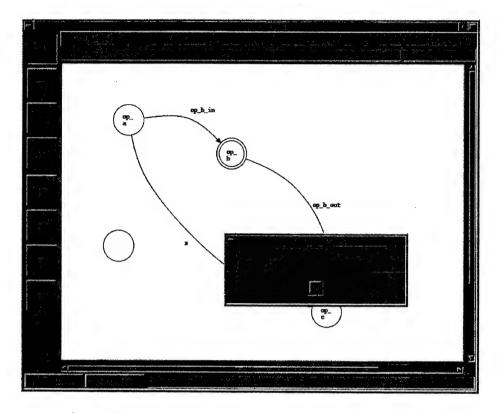


Figure 48. Graph Editor Detected Error

5. Syntax/Semantics Checking

Syntax and semantic validation tests are distributed throughout the PSDL Editor. Most syntax errors and and a few semantic errors are detected by the graph editor. The graph editor performs syntax and semantic validation upon entry of each data object, typically before the data object is written to the editor's internal representation of the prototype. Errors detected by the graph editor are reported with an information pop-up window, which must be acknowledged. An error indication is also provided in the Status Message Window, reference Component 9 in Figure 32, which serves as a reminder after the pop-up window has been acknowledged.

Figure 48 is an example of an error detected by the graph editor. In this example, the operator name op_a is being reused for the new operator in the same data flow diagram. Since op_a has already been used within the composite operator,

Table XVI. Invoking Syntax/Semantic Validation

CHECK SYNTAX button from STATUS BAR SAVE REQUIRED button from STATUS BAR SAVE option from FILE MENU RESTORE FROM SAVE option from FILE MENU SYNTAX CHECK option from PSDL MENU ABANDON CHANGES option from EDIT MENU

an error message is generated. Upon acknowledging the pop-up notice, the Status Message Window will be retained until the next user operation. In this instance, the PSDL Editor automatically removes the duplicate name from the operator, in order to maintain a valid PSDL prototype. Had the error occurred during entry of the operator name from the Operator Property pop-up window, the invalid operator name would not have been removed. Since changes to the operator from the Operator Property pop-up window will not be accepted until all errors have been resolved, the name is retained so that the user can correct the error.

Other validation checks can only be performed from a global perspective. These errors can only be detected by the background checker. While the graph editor performs validation upon data entry, the background checker can only validate the prototype when the prototype is synchronized with the graph editor and the background checker is passed control.

a. Invoking Syntax/Semantic Validation

Syntax and semantic validation by the background checker is performed whenever possible. In order to improve the responsiveness of the PSDL Editor, validation is not performed every time that the editor is synchronized. Table XVI identifies all user action which invokes the background checker to perform validation checks.

b. Error Messages

Upon returning command to the graph editor, any errors detected by the background checker will result in the CHECK SYNTAX button being replaced with the ERROR MSGS button on the Status Bar. By selecting this button, an Error Messages pop-up window will be presented, as depicted in Figure 27. Within the Error Messages pop-up window, the user can select an error message and directly go to one of two operators associated with the error. The Current operator is the operator in which the background checker detected the error. The Parent operator is relative to the operator in which the error was detected.

6. PSDL Output

The output of the PSDL Editor is the PSDL code, which implements the prototype. An example of PSDL code is provided in Appendix B. Identifiers in the PSDL code differ from those observed in the PSDL Editor, with the addition of suffixes in the PSDL code. Hard copies of an operator's data flow diagram can be obtained from the PSDL Editor through the use of the PRINT function under the FILE MENU (reference Figure 31).

V. IMPLEMENTATION

The PSDL Editor has been a team effort. The architecture of having two programs (i.e., the background checker and the graph editor) work together to provide an integrated editor facility immediately lends itself to a team development. Professor Man-Tak Shing was responsible for this version of the background checker. The focus of this research has been the graph editor along with the integration of the two programs. Reference Appendix D for a listing of the complete graph editor source code. The source code for the background checker is not available in this document. However, it is available from the CAPS Research Team at the Naval Postgraduate School, Computer Science department. Appendix E provides guidelines for the installation of the PSDL Editor.

A. ARCHITECTURE OVERVIEW

The PSDL Editor architecture is characterized as having two programs, executed in separate processes, which share information through interprocess channels. The background checker provides the facilities for all file processing, input parsing of a PSDL prototype, syntax and semantic validation of the prototype, and PSDL code generation. The graph editor provides a graphical user interface and facilitates the viewing and editing of the PSDL prototype. Localized syntax and semantic validation is also performed by the graph editor.

1. Program Evolution

The current architecture of the PSDL Editor is the result of an evolution process. The CAPS Release 1 PSDL Editor was the baseline from which this research was initiated. Much of the new design is the creation of Professor Man-Tak Shing, who utilized the PSDL Editor as the class project in re-engineering of a software engineering tool. The results of this class project were then expanded upon to produce this research effort.

a. CAPS Release 1 PSDL Editor

The CAPS Release 1 PSDL Editor was developed by Captain Robert Dixon, USMC [Ref. 13]. Captain Dixon's version of the editor was implemented as two programs, the syntax-directed editor and the graph editor. Data was shared between the two programs using two files. Figure 49 illustrates the architecture used to implement the PSDL Editor. The two files supported the limited data sharing required for the data flow diagram. The first file, gedatatransfile.txt, was used to import the data flow diagram into the graph editor as well as to make intermediate saves. The second file, gedatatransfile2.txt, was used to export the data flow diagram back to the syntax-directed editor. A special file, gedatatransfile.lock, was used to protect the files in case multiple copies of the PSDL Editor were executed in the same directory space.

Within the graph editor, the C++ class GraphObjectList was used to represent the data flow diagram. Captain Dixon's thesis [Ref. 13], describes the class structure used by the graph editor. The data flow diagram itself is represented as a linked list of operator and stream objects. The common features of both of these objects are grouped together in the base class GraphObject, from which the OperatorObject and StreamObject classes are derived. This class structure is depicted inside the graph editor process of Figure 49.

Upon execution of the graph editor, the representation of the data flow diagram was read from gedatatransfile.txt into the GraphObjectList data structure by build_from_disk(). Upon returning to the syntax-directed editor, write_to_disk() was used to write the GraphObjectList data structure into the file gedatatransfile2.txt, to be read by the syntax-directed editor.

A command line argument was used by the syntax-directed editor to indicate if the graph editor was to be executed as a data flow diagram viewer or an editor. The same program was used for both applications.

Most of the code used to facilitate the data flow diagram was used

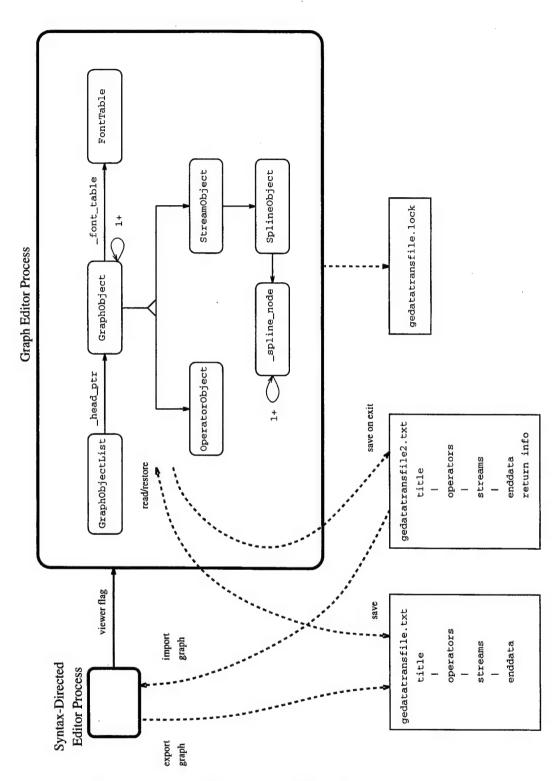


Figure 49. CAPS Release 1 PSDL Editor Architecture

directly to support this research effort. Enhancements were made to provide for the direct entry of operator and stream labels. In addition, an abort was added to the stream creation process. The two files used to share information between the syntax-directed editor and the graph editor were eliminated, along with the associated methods which supported the reading and writing of data to these files. The class structure was maintained. Additional fields and methods were added to the classes in order to support the full specification of a PSDL operator.

b. CS4520 Class Project

Professor Man-Tak Shing introduced the PSDL Editor as the class project for the Naval Postgraduate School course CS4520 (AY96Q4). CS4520 is a topical software engineering class. This particular class dealt with software reengineering. The goal of the class project was to re-engineer the PSDL Editor to provide a more user-friendly editing facility. Only the graph editor was evaluated as part of the class project.

In addition to implementing a new user interface, the new graph editor was to be implemented as a C++ function. All data to be shared between the background checker and the graph editor was to be passed as arguments in the function call. Although only the graph editor was being implemented, the new graph editor was to be integrated with the syntax-directed editor in a single process.

The interface which was used to pass data between the background checker and the graph editor was defined by ge_interface.h. Data structures defined in ge_interface.h expanded upon the data transferred by gedatatransfile.txt, used in the CAPS Release 1 PSDL Editor. Within the graph editor, the original GraphObjectList class structure was maintained. Methods were developed to transfer data between the ge_interface.h data structures and the GraphObjectList class structure. These methods replaced the build_from_disk() and write_to_disk() methods used in CAPS Release 1.

Upon completion of the CS4520 class projects, Professors Valdis Berzins and Man-Tak Shing reviewed all the projects. The project produced by Mr. Douglas

Lange and Mr. Dagohoy Anunciado was chosen to be used for continued research of the CAPS PSDL Editor.

c. Thesis Research

Picking up from the work initiated by Mr. Douglas Lange and Mr. Dagohoy Anunciado, the completion of the graphical user interface was accomplished for the graph editor, along with implementing addition features. Initially, all work on the graph editor was accomplished in a stand-alone fashion, using a simulated background checker driver program. Later, the graph editor was integrated with the background checker. The background checker was created by Professor Man-Tak Shing, using the Synthesizer Generator. The result was an Ada/C program, which was used to call the C++ routine that was the graph editor.

Figure 50 provides a visualization of the PSDL Editor architecture. The PSDL Editor consisted of a single process. The background checker would read the specified PSDL prototype from a file and parse the prototype into the prototype data structure. The current operator would be extracted from the syntax-directed editor data structure and formatted in accordance with the ge_interface.h specification. This data would be passed as arguments to the graph editor function. Inside the graph editor routine, the current operator was loaded from the ge_interface.h data structures into the GraphObjectList class structure (as depicted inside the graph editor process of Figure 49). Upon exiting the graph editor, the process was reversed. The GraphObjectList class structure was dumped into the ge_interface.h data structures, which were dumped into the prototype data structurefor processing.

While development of the graph editor continued, testing was conducted as an integrated unit. X Window System problems were encountered while executing the background checker and the graph editor within a single process. These problems were not observed while executing the graph editor with a simulated background checker driver program.

Additional complications were encountered while troubleshooting the system. With the background checker being implemented in Ada and C and the

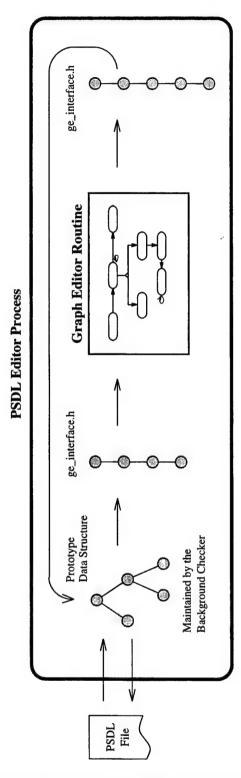


Figure 50. Initial PSDL Editor Architecture

graph editor being implemented in C++, difficulties were encounter using the source debuggers. Finally, errors reported within the X Window System routines could not be traced since there was no source code for the X Window System. This configuration resulted in difficulty troubleshooting all problems with the editor, typically using output statements to debug the program.

These problems were resolved by once again splitting the PSDL Editor into two segments, the background checker and the graph editor, executed in two separate processes. This configuration also supported the source debuggers, which were a great aid to the development of the PSDL Editor.

Figure 51 provides a visualization of the final PSDL Editor architecture, in which the graph editor is executed in a separate process. The background checker is responsible for forking a child process and establishing the pipe lines for interprocess communication. Within the background checker, the graph editor routine has been replaced with calls to transfer the ge_interface.h data structures to the graph editor process. A driver ge_driver.C routine was added to the front of the graph editor. This routine is responsible for accepting the ge_interface.h data structures over the interprocess communication pipe line and passing them onto the graph editor routine. Upon exiting the graph editor routine, the ge_driver.C routine passes the ge_interface.h data structure back to the background checker.

Early testing of the PSDL Editor was accomplished using a small prototype. This prototype was filled with PSDL features, which tested most of the PSDL Editor, however, it was not a very stressful test. Later, additional testing was accomplished using a medium size prototype. Upon testing with the avionics_example prototype, found in Appendix B, problems were encountered. The initial problem, which was obvious to any user, was the delays encountered while using the PSDL Editor. Where one of the initial complaints of the CAPS Release 1 PSDL Editor was the delays between interacting with the syntax-directed editor and the graph editor, the new implementation had even longer delays. Delays from 30 to 45 seconds were

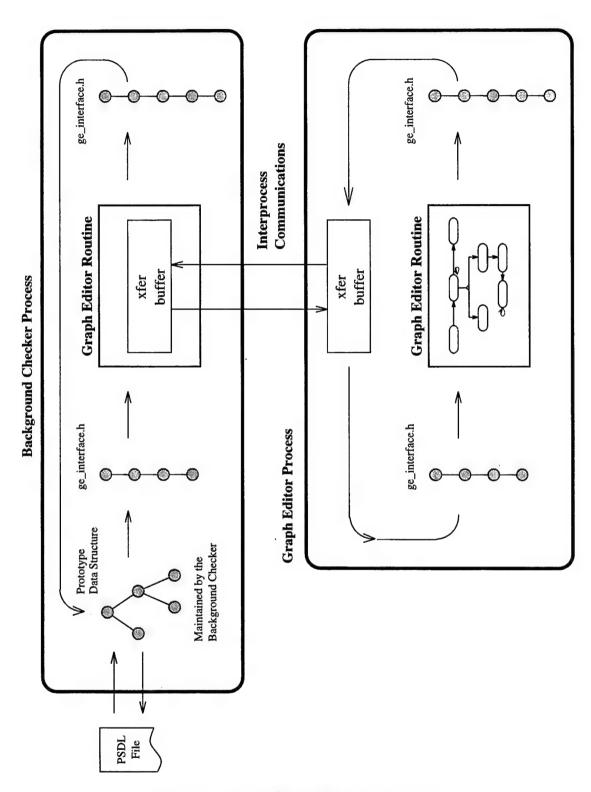


Figure 51. Final PSDL Editor Architecture

typical when navigating through the avionics_example.

Prolonged use of the PSDL Editor resulted in the second big problem, the system ran out of memory. In such a case, the PSDL Editor session had to be aborted. All unsaved changes to the prototype were lost. These problems are further defined under the Lessons Learned paragraph of Appendix B.

Analysis of the PSDL Editor indicated that both the delay and the memory problems were due to the background checker. These problems, as well as the desire to increase portability by removing the reliance on the Synthesizer Generator, resulted in the development of the new Ada background checker.

2. Architecture

The PSDL Editor, in its final configuration, consists of two segments, the background checker and the graph editor. As depicted in Figure 51, each segment is executed within its own process. Communication between the two segments is accomplished using Unix pipes. Two pipes are opened to provide bi-directional communication between the two processes. Input to the PSDL Editor consists of a single file containing the PSDL prototype. Output of the PSDL Editor is also a single PSDL file. All user interaction is performed through the graphical user interface provided by the graph editor. The graphical user interface is implemented as an X Window System application using the Motif widget set. Communication between the two processes is based upon the ge_interface.h data structures.

3. Data Communications

The interface between the background checker and the graph editor supports the bi-directional transfer of PSDL data. In addition, errors detected by the background checker are transfered to the graph editor. While the graph editor commands the background checker to perform the next action. All interprocess communication is defined by the file ge_interface.h. Along with the data structures to support the above communications, ge_interface.h provides common definitions.

a. Graph Description

The structure GRAPH_DESC provides all of the information regarding the prototype required by the graph editor. Only one operator is processed by the graph editor at a time, although some global prototype information is shared. The GRAPH_DESC structure represents the operator's data flow diagram as a linked list of OPERATOR structures as well as a linked list of STREAM structures. The GRAPH_DESC structure is used in bi-directional communication with the background checker and the graph editor.

b. Error Messages

Errors detected by the background checker can only be presented to the user through the graphical user interface provided by the graph editor. The data structure ERROR_MSGS is a linked list of error messages, along with associated operator and parent operator identification. If no errors are detected by the background checker, a NULL pointer shall be provided to the graph editor.

c. Next Action

The data structure ACTION provides the background checker with the commands required to determine the next action to take. Instruction is provided on how to synchronize the data contained within GRAPH_DESC with the prototype data structure, maintained by the background checker. Also provided are instructions on returning to the graph editor with the desired current operator.

1

4. Synchronization

Within the graph editor, all changes to an operator are local to the graph editor. Local changes are synchronized with the prototype maintained by the background checker upon specific user requested events. The synchronization, along with the user specified event, were listed in Table XV of Chapter IV. All synchronization is a function of the background checker. A distinction was made between UPDATE_TREE and CHECK_SYNTAX as a concession to performance. Initially, syntax validation was performed with each synchronization event. However, large delays to perform syn-

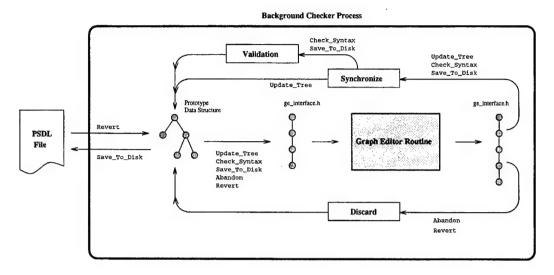


Figure 52. Background Checker Synchronization

tax validation made this option unattractive for all synchronization events. Thus, UPDATE_TREE was added as an option, in which the prototype data structure, maintained by the background checker, were synchronized with any modifications made in the graph editor, but with no syntax validation. This option was provided to improver performance while navigating the prototype. Figure 52 illustrates the type of processing which is expected to be performed by the background checker based on the synchronization command.

B. GRAPH EDITOR DATA STRUCTURES

Within the graph editor, the GraphObjectList class structure is used to maintain all PSDL data. Captain Dixon described this structure in his thesis [Ref. 13]. This class structure has been maintained with this release of the PSDL Editor. A class diagram of the GraphObjectList structure was provided within the graph editor process box of Figure 49.

All information contained within GRAPH_DESC, from ge_interface.h, which does not relate to the data flow diagram was appended to the GraphObjectList

class. Changes were made to all classes that incorporated a time literal. In the CAPS Release 1 PSDL Editor, time literals were encoded as signed integers. All time values in microseconds were encoded as negative times. Values in milliseconds were encoded as positive times. In order to support all time units defined in the CAPS Release 2 PSDL grammar, time literals were maintained with two symbols. One maintained the time value, the other maintained the time units.

Data flow diagram representation information was appended to class objects OperatorObject and StreamObject as applicable. Label and time values, displayed on the data flow diagram, for both operators and streams were modified to function as offsets from the graphics object. Previously, labels and time values were recorded at absolute locations. Methods were added to support the ge_interface.h structures.

C. UTILITIES

Several sets of utilities files were created in the process of developing the PSDL Editor.

1. Graph Editor Utilities

The files ge_utilities.h and ge_utilities.c provide a set of routines for dealing with components of the PSDL Editor. These files were written in C in order to support both the graph editor as well as the original syntax-directed editor (which was written in C due to the Synthesizer Generator). Primarily, the routines in these files support the maintenance of the data structures defined in ge_interface.h. The routine dup_str() is used throughout the PSDL Editor. This routine is used to make a deep copy of a string. In general, the PSDL Editor is implemented using deep copies. Shared values have been avoided.

Another facility provided by the ge_utilities routines is the validation of PSDL constructs. These routines are used by the graph editor to validate identifiers, operator identifiers, type names, keywords, and integer literals.

Table XVII. Inter-Process Communication Routines

readAction()	writeAction()
readErrorMsgs()	<pre>writeErrorMsgs()</pre>
readGraphDesc()	<pre>writeGraphDesc()</pre>

2. Inter-Process Communication

The inter-process communication package was designed to accept the data structures defined by ge_interface.h at one end and recreate the same data structures on the other end. These communication facilities are provided by the routines in the files inter_process_utilities.h and inter_process_utilities.c. Once again, these files were written in C to support both the background checker and the graph editor.

The inter-process communication facility is provided by six routines listed in Table XVII. These routines operate on a xfer_buffer. The xfer_buffer is allowed to expand, doubling in size each time, in order to support the largest data structure. The xfer_buffer itself is sent over Unix pipes in packets with a maximum size of 4096 bytes.

The pipe lines used to facilitate inter-process communications are established by the background checker upon creation of the graph editor process. Two pipe lines are opened, in order to provide bi-directional communication. The two channels to be used are passed to the graph editor as command line arguments. The file ge_driver.C is the main() routine for the graph editor. This file processes the command line arguments containing the channel numbers. The code used to open the pipe lines is provided by the background checker. A sample of code used to facilitate this process may be found in the file sde.c, which is discussed below.

3. Unique Identifier Generator

The incorporation of unique suffixes for operators required a unique suffix generator. The files get_unique_id.h and get_unique_id.c provide this facility.

Once again, these files were developed in C in order to support both the graph editor and the background checker. This implementation uses a file named unique_id.dat from which to generate sequential integers. Future releases of the PSDL Editor shall utilize a data base to provide unique identifiers across a distributed development environment (reference Professor Berzins' memo included as Attachment C). The current implementation is limited to the visibility of the unique_id.data file.

4. Program Development Aids

Several files used develop the PSDL Editor have been included within the source code for the graph editor. While not required for operation of the PSDL Editor, they may be useful for future development efforts.

a. Driver Program

The files sde.c, sde_simulator.h, and sde_simulator.c were developed to perform stand alone testing of the graph editor. The file sde.c provides the main() routine used to fork the graph editor in its own process as well as to establish communications. The sde_simulator files provide a hard-coded prototype which can be edited. Note that this driver program has not been designed to work interactively with the graph editor. The driver program does not contain the facilities to synchronize with the graph editor.

While the source code for the background checker is not contained here, the file sde.c does provide an example of code used to fork the graph editor process and to establish communication pipe lines.

b. Debug Routines

In the process of integrating the background checker and the graph editor, often there was a need to examine the data contained within the ge_interface.h data structures. A collection of routines provided in files ge_utilities_debug.h, ge_utilities_debug.c, and ge_interface_labels.h were developed to display and print to a file the contents of the ge_interface.h data structures.

D. GRAPH EDITOR

The files used to implement the graph editor, roughly organized by function, are listed in Table XVIII. The graph editor routine which actually edits the prototype is edit_graph(), defined in graph_editor.C. This routine is called from ge_driver.C upon receiving the ge_interface.h data structure from the background checker. At every synchronization event, this routine is exited. Within edit_graph(), the Motif windows are initialized. Initialization is performed once, based on the symbol motif_initialized. After the initial entry, the Motif environment is assumed to exist. Motif data is maintained within global objects in order to provide persistence.

Typically, a Motif application expects to pass control over to Motif until the program terminates. In order to support the PSDL Editor, the Motif control loop had to be maintained within the graph editor. The edit_graph() routine enters a loop which dispatches X Window System events until a synchronization event is selected by the user to exit the graph editor.

Table XVIII. Graph Editor Source Code Files

Function	Header File	Code File
Graph Editor		ge_driver.c
-	${\tt graph_editor.h}$	graph_editor.C
Definition Files	ge_interface.h	
	ge_defs.h	
	resources.h	
Classes	graph_object_list.h	graph_object_list.C
	${\tt graph_object.h}$	graph_object.C
	operator_object.h	operator_object.C
	stream_object.h	stream_object.C
	spline_object.h	spline_object.C
	font_table.h	font_table.C
Pop-up Windows	operator_property_menu.h	operator_property_menu.C
	stream_property_menu.h	stream_property_menu.C
Window Utilities	action_area.h	action_area.C
	build_option.h	build_option.c
	gettopshell.h	gettopshell.c
	postpopup.h	postpopup.c
	report_errors.h	report_errors.C
	setcursor.h	setcursor.c
	timer_tool.h	timer_tool.C
	warning.h	warning.C
	windows.h	windows.C
Utilities	ge_utilities.h	ge_utilities.c
	inter_process_utilities.h	inter_process_utilities.c
	get_unique_id.h	get_unique_id.c
		sde.c
	sde_simulator.h	sde_simulator.c
	ge_utilities_debug.h	ge_utilities_debug.c
	ge_interface_labels.h	

VI. CONCLUSIONS AND RECOMMENDATIONS

Overall, this research was successful in the development of an improved PSDL Editor facility. While full graphical user interface support was not provided for all features of PSDL, sufficient portions of the language were supported to demonstrate the concepts of the improved interface.

Since the aspects of the PSDL Editor addressed by this research primarily relate to human factors, any validation of the improvements made would have to be accomplished with a survey of users. Such a survey was not conducted as part of this research, so no conclusions can be stated regarding the effectiveness of the improvements. However, a few personal observations from experience obtained while testing the PSDL Editor can be made along with some recommendations for future research.

A. RESULTS OF RESEARCH

Based on personal experience with the PSDL Editor, I would submit that the artificial boundary between the syntax-directed editor and the graph editor has been significantly reduced. What remains of the boundary is the batch mode of operation when it comes to global syntax and semantic validation as well as any delays encountered switching between the two programs. While early versions of the improved PSDL Editor had significant delays, optimizations within the background checker have resulted in acceptable delay times, even for large prototypes.

Use of pop-up windows to specify the details of an operator or stream has streamlined the development of prototypes. Immediate access to complete details of a data flow diagram object are now one button away. No longer are users compelled to complete the data flow diagram prior to entering any of the details, due to the long delays and steps required to access this data. Direct entry of operator and stream

labels has been a significant step in streamlining the development process.

Previous problems encountered by users attempting to locate a construct within the syntax-directed editor should not be as prevalent with the use of pop-up windows. These problems, associated with a linear translation of the PSDL grammar, are reduced by the depiction of all options within the pop-up window. Options displayed in the pop-up window are consistent with the current configuration of the object. No longer must a user remember the ordering of PSDL constructs, they are visible to the user from the pop-up window. Ghosting of an option acts to remind the user of the availability of an option while the physical location of the options suggest dependencies between options.

An improvement which should reduce the amount of lost work in the PSDL Editor was the simplification of file operations. All file save operations now write directly to the prototype file. There is no longer an intermediate file to which the editor saves the prototype, from which users have lost entire edit sessions due to a misunderstanding of the save procedure. The currently implemented file system should be intuitive to most users of personnel computer software.

As previously mentioned, not all features of PSDL were implemented with the graphical user interface. Several features of PSDL were determined to be too complex for this initial implementation of the graphical user interface. These features included abstract data types, constraint options, expressions, and the specification interface. Although not supported by the graphical user interface, these features were not left unsupported. Text windows were provided within the graph editor for the specification of these constructs using PSDL. Being some of the more complex PSDL constructs, they are also some of the more advanced features. And while all these features are critical to the use of PSDL, they are most often used by more advanced users. The result is that the PSDL Editor provides sufficient capabilities to be utilized for prototype development by the average user. More advanced users can still utilize the PSDL Editor, however, they will require more knowledge of PSDL to access these

B. CRITIC OF RESEARCH

As with any program, criticism can be made of the design and implementation. This program offers no exception. Discussed below are observations of problems in the design and implementation. I do not point a finger to any previous author of the PSDL Editor for problems with this release. All of the problems, both in design and implementation, were mine to address. What few problems were inherited from previous authors were most likely small problems which I have amplified in "improving" the program. But just as there was insufficient time to support all features of PSDL, there was insufficient time to address these "features" of the PSDL Editor.

1. User Interface

The mapping between the PSDL Editor's graphical user interface and PSDL is not clean. For instance, the functionality of an operator's specification is accessed through the pop-up window for a composite operator. This mapping does not support the root operator.

The drawing operation of the data flow diagram is too slow. While there may be a tendency to coerce the user to maintain good programming practices and keep the data flow diagram simple, it should not be accomplished by aggravating the user with delays. The drawing of streams, and especially state streams, is extremely slow. The system is not usable, when executed remotely over phone lines.

Associated with the delays involved with drawing the data flow diagram, the data flow diagram is too sensitive to change. Unintentional changes are typically made to the data flow diagram as the user attempts to navigate the prototype. In order to navigate through the prototype, the user must select an operator. If the user moves the mouse while the left-mouse button is depressed, the object will be moved and the user will have to wait for the data flow diagram drawing to be updated.

The pop-up facilities to modify an operator's color or a label's font as well as those used to recover a deleted operator are rudimentary. No provisions are made to indicate the currently selected color or font. No provisions are made to Ok the selection or to cancel the operation. The user is required to know how to select the item with a double mouse action as well as the current value, in case the user wishes to leave the value unchanged. No feedback is provided to the user to indicate that a color or font change is being performed on a specific object or the default value is being changed. The restoration of an unlabeled operator is a guessing game for the user.

2. Implementation

The PSDL Editor started out as two programs, executed in separate processes. As an update to the design, it was converted over to a single program, executed in a single process. Problems encountered with this configuration forced it to be split once more into two programs, executed in separate processes. Again, problems were encountered which forced a change to the design of the editor. This last change has seen the removal of the Synthesizer Generator produced background checker, to be replaced with an Ada version. With this latest change, no modification was made to the interface between the background checker and the graph editor. With the design changes which have occurred so far, maintaining two separate programs may be wise. However, at this point, two separate processes appears to be unnecessary. Associated with two separate processes is a lot of communication overhead which could be removed, thus simplifying the program. Combining the two tasks into one procedure would also improve the performance with respect to delays, thus further reducing the artificial boundary between the background checker and the graph editor.

With the evolution of the graph editor, the program has become "messy". The program has appeared to have lost any structure as new features are simply added. Global objects are used throughout the program to provide communication with the graphical user interface. Files have become much too large. The graph_editor.C

file, once printed, goes on for fifty pages. The draw routine alone is ten pages long, with far too many levels of indentation. Even simple maintenance to the program becomes complex and error prone with this absence of organization.

Within the graph editor, a clean representation of data objects has not been maintained. Redundant data is maintained throughout the data objects. For instance, which graphical object is selected is indicated within the data structure for that object. Thus a house keeping process must be maintained to ensure that only one object is selected at at time, clearing all other selected objects. The result is that, occasionally, multiple graphic objects appear to be selected. The user is confused at this point. Only by selecting and de-selecting each object that appears to be selected can the indications be cleared up.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

In the process of re-engineering the PSDL Editor, many additional ideas come to mind. Most of which are much too late to be incorporated into the design of the system. The following is a collection of ideas which should be used to stimulate thought for the next release of the PSDL Editor.

The current design of the graphical user interface provides a very limited view of the context of an operator. The user is presented with the data flow diagram of the operator, but no visualization of the context of the operator. The CAPS Release 1 PSDL Editor provided some indication of external streams. Even this limited view of context was removed from this release of the PSDL Editor. Future releases of the PSDL Editor should prompt the user with options available from the operator's context. Figures 53 and 54 depict an initial attempt to provide the user with such a context with respect to streams. Figure 53 illustrates the user's options of entering a stream name directly into the data entry window or to select from a list of predefined streams. Figure 54 depicts all streams which are currently defined in the context, along with an indication of external streams and their use, state streams and their

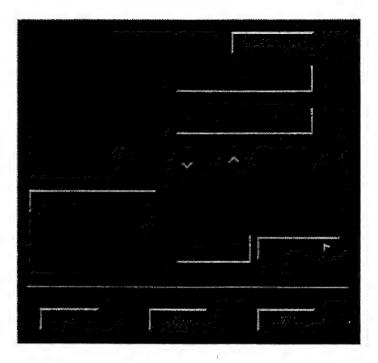


Figure 53. Stream Property Pop-up with Predefined Option

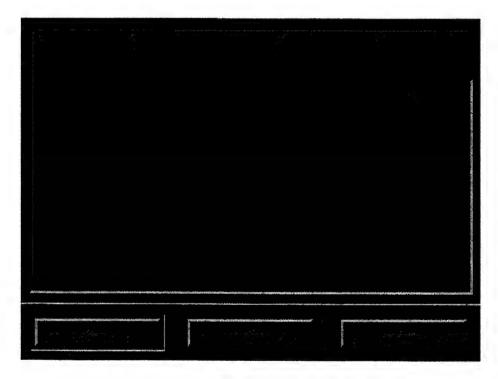


Figure 54. Stream Predefined Context

initial value, and the stream type. Due to scheduling constraints, this option was never incorporated into the final release of the PSDL Editor.

Options available for improved data flow diagram editing capabilities mostly involve modifications to streams. Such features as being able to remove or add intermediate stream anchor points as well as being able to change the direction of a stream would improve the user's ability to modify an existing data flow diagram. Higher level edit features for working with operators would also greatly improve the user's ability to modify a prototype. Such features would include the ability to select a group of operators from a single data flow diagram and form a composite operator from them, thus adding one more level to the hierarchical tree. The reverse operation could also be provided as a feature, to remove a level from the hierarchical tree. Copy, cut, and paste operations on selected operators could be provided. Modifications to object properties, such as color and font, could be performed on several selected objects simultaneously.

Improved semantic validation capabilities could be incorporated. Possible candidates include detecting cycles in data flow diagrams which are not broken by state streams and global validation of timing constraints. This release of the PSDL Editor took a step backward in editing an existing prototype. In order to edit a prototype, the editor must be able to parse the input file. Syntactical errors in the input file could result in the PSDL Editor not being able to parse the prototype. Previously, the PSDL Editor would at least allow the user to edit the prototype text if a syntactical error was detected. With this release, the PSDL Editor is not usable on a corrupted prototype.

While the CAPS environment provides access to the complete set of CAPS tools, many of these tools could be integrated with the PSDL Editor. Tighter integration of CAPS tools could provide:

• Automatic generation of skeleton files to support atomic operators. This capability has become a necessity with the inclusion of unique suffixes to operators.

- •Direct access to an editor to view/edit an atomic operator implementation.
- •Access to the reuse library from the PSDL Edit based on an operator's specification.
- •A PSDL Editor mode for performing maintenance on the reuse library.
- •The ability to save a prototype as a new revision within the Evolution Control System.
- •The ability to merge prototypes.
- •The ability to examine the prototype schedule from the editor. Computer assistance should be provided on how to modify the prototype in order to change the schedule.

Finally, with the advances made in internet and intranet technologies comes the opportunity to improve upon existing applications. The migration of the PSDL Editor's help facilities to a hyper-text mark-up language (HTML) based system should be straight forward. Such a system would be a great improvement over the existing capability. The conversion of the PSDL Editor over to a internet/intranet application would be much more involved. However, the resulting facility would provide a portable editor capable of supporting distributed prototype development.

APPENDIX A. PSDL GRAMMAR.

The following is the complete specification of the Prototype System Description Language (PSDL) syntax in an extension of Backus-Naur Form (BNF) [Ref. 14].

The BNF description of PSDL specifies the sequence of symbols which constitute a valid PSDL prototype. BNF describes the language in terms of production rules. Each production rule equates a non-terminal symbol to a sequence of terminal and non-terminal symbols. Terminal symbols are symbols which can occur in PSDL. Non-terminal symbols are metalinguistic variables whose value is a sequence of symbols which represents a PSDL construct.

Terminals are represented as **bold** symbols (e.g., **operator**). Non-terminals are enclosed in angle brackets, \langle and \rangle (e.g., $\langle psdl \rangle$). Additional metasymbols are introduced in the extension of BNF to reduce the number of productions and non-terminals. These metasymbols are defined as:

- •Square brackets, [], enclose optional items.
- ulletCurly braces, $\{\ \}$, enclose items which may appear zero or more times.
- •Vertical bars, |, represent a choice between items.
- •Parentheses, (), represent a grouping of items.

In some cases, the metasymbols used are also used as terminals within PSDL. In order to avoid confusion, such terminal symbols are enclosed within single quotes, (e.g., ')').

For ease of reference, each production rule is numbered on the left hand side. These numbers are not part of the PSDL syntax.

```
1
          \langle psdl \rangle
                  := \{ \langle component \rangle \}
2
          \langle component \rangle
                  ::= \langle data\_type \rangle
                       |\langle operator \rangle|
3
          \langle data\_type \rangle
                  ::= \mathbf{type} \langle id \rangle \langle type\_spec \rangle \langle type\_impl \rangle
4
          \langle type\_spec \rangle
                  ::= specification [generic \langle type\_decl \rangle] [\langle type\_decl \rangle]
                           { operator \langle op\_name \rangle \langle operator\_spec \rangle }
                           [\langle functionality \rangle] end
5
          \langle operator \rangle
                  ::= operator \langle op\_name \rangle \langle operator\_spec \rangle \langle operator\_impl \rangle
6
          \langle operator\_spec \rangle
                  := specification { \langle interface \rangle } [ \langle functionality \rangle ] end
7
          \langle interface \rangle
                  ::= \langle attribute \rangle [\langle reqmts\_trace \rangle]
8
          \langle attribute \rangle
                  ::= generic \langle type\_decl \rangle
                       | input \langle type\_decl \rangle
                        | output \langle type\_decl \rangle
                       | states \(\lambda type_decl\rangle\) initially \(\lambda initial_expression_list\rangle\)
                       | exceptions \langle id list \rangle
                          maximum execution time \langle time \rangle
9
         \langle type\_decl \rangle
                 ::= \langle id\_list \rangle : \langle type\_name \rangle \{ , \langle id\_list \rangle : \langle type\_name \rangle \}
10
          \langle type\_name \rangle
                 ::=\langle id \rangle
                       | \langle id \rangle '[' \langle type_decl \rangle ']'
11
         \langle id \exists ist \rangle
                 ::= \langle id \rangle \{ , \langle id \rangle \}
```

```
12
         \langle reqmts\_trace \rangle
                 ::= required by \langle id \, Jist \rangle
13
         \langle functionality \rangle
                 ::= [\langle keywords \rangle] [\langle informal\_desc \rangle] [\langle formal\_desc \rangle]
14
         \langle keywords \rangle
                 ::= keywords \langle id list \rangle
15
          \langle informal\_desc \rangle
                 ::= description '{' \langle text \rangle '}'
          \langle formal\_desc \rangle
16
                 ::= axioms '{' \langle text \rangle '}'
17
          \langle type\_impl \rangle
                 ::= implementation \langle id \rangle \langle id \rangle end
                       | implementation \langle type\_name \rangle
                           { operator \langle op\_name \rangle \langle operator\_impl \rangle } end
18
         \langle operator\_impl \rangle
                 ::= implementation \langle id \rangle \langle id \rangle end
                       | implementation \langle psdl_impl \rangle end
19
          \langle psdl\_impl \rangle
                           \langle data\_flow\_diagram \rangle \ [\ \langle streams \rangle \ ] \ [\ \langle timers \rangle \ ]
                 ::=
                           [\langle control\_constraints \rangle] [\langle informal\_desc \rangle]
20
          \langle data\_flow\_diagram \rangle
                 ::= \mathbf{graph} \{ \langle vertex \rangle \} \{ \langle edge \rangle \}
21
          \langle vertex \rangle
                          vertex \langle op\_id \rangle [: \langle time \rangle] { \langle property \rangle}
                 ::=
22
          \langle edge \rangle
                 ::= \mathbf{edge} \ \langle id \rangle \ [: \langle time \rangle \ ] \ \langle op\_id \rangle \ -> \ \langle op\_id \rangle \ \{ \ \langle property \rangle \ \}
23
          \langle property \rangle
                 ::= property \langle id \rangle = \langle expression \rangle
24
          \langle op\_id \rangle
                 ::= [\langle id \rangle, ] \langle op\_name \rangle ['(' [\langle id\_list \rangle]' | ' [\langle id\_list \rangle]')']
```

```
\langle streams \rangle
25
                 ::=
                       data stream \langle type\_decl \rangle
26
         \langle timers \rangle
                ::=
                       \mathbf{timer} \ \langle id \lrcorner list \rangle
27
         \langle control\_constraints \rangle
                ::= control constraints \langle constraint \rangle \{ \langle constraint \rangle \}
28
         \langle constraint \rangle
                ::= operator \langle op_{-}id \rangle
                          [ triggered [ \langle trigger \rangle ] [ if \langle expression \rangle ] [ \langle reqmts\_trace \rangle ] ]
                            period \langle time \rangle [ \langle reqmts\_trace \rangle ]
                          [ finish within \langle time \rangle [ \langle reqmts\_trace \rangle ] ]
                           minimum calling period \langle time \rangle [ \langle reqmts\_trace \rangle ] ]
                            maximum response time \langle time \rangle [ \langle regmts\_trace \rangle ] ]
                          \{ \langle constraint\_options \rangle \}
29
         \langle constraint\_options \rangle
                ::= output \langle id \exists list \rangle if \langle expression \rangle [ \langle reqmts\_trace \rangle ]
                      \mid exception \langle id \rangle [ if \langle expression \rangle ] [ \langle reqmts\_trace \rangle ]
                         \langle timer\_op \rangle \langle id \rangle [ if \langle expression \rangle ] [ \langle regmts\_trace \rangle ]
30
         \langle trigger \rangle
                := by all \langle id list \rangle
                      | by some \langle id\_list \rangle
31
         \langle timer\_op \rangle
                ::= reset timer
                         start timer
                         stop timer
32
         \langle initial\_expression\_list \rangle
                        \langle initial\_expression \rangle \{ , \langle initial\_expression \rangle \}
33
         \langle initial\_expression \rangle
                := true
                         false
                          \langle integer\_literal \rangle
                         \langle real\_literal \rangle
                          \langle string\_literal \rangle
```

```
\langle id \rangle
                        ⟨type_name⟩ . ⟨op_name⟩ [ '(' ⟨initial_expression_list⟩ ')' ]
                     | '(' \langle initial\_expression \rangle ')'
                     |\langle initial\_expression \rangle \langle binary\_op \rangle \langle initial\_expression \rangle
                     |\langle unary\_op \rangle \langle initial\_expression \rangle|
34
         \langle binary\_op \rangle
                := and | or | xor
                     | < | > | = | >= | <= | / =
                     | + | - | & | * | / | \mod | rem | **
35
         \langle unary\_op \rangle
                := not \mid abs \mid - \mid +
36
         \langle time \rangle
                ::= \langle integer\_literal \rangle \langle unit \rangle
37
        \langle unit \rangle
                ::= microsec
                        \mathbf{m}\mathbf{s}
                         sec
                         min
                        hours
38
         \langle expression\_list \rangle
                ::= \langle expression \rangle \{ , \langle expression \rangle \}
39
         \langle expression \rangle
                := true
                     false
                         \langle integer\_literal \rangle
                         \langle time \rangle
                         \langle real\_literal \rangle
                         \langle string\_literal \rangle
                         \langle id \rangle
                        \langle type\_name \rangle . \langle op\_name \rangle ['(' \langle expression\_list \rangle')']
                     | '(' \langle expression \rangle ')'
                       \langle expression \rangle \langle binary\_op \rangle \langle expression \rangle
                     |\langle unary\_op \rangle \langle expression \rangle|
40
         \langle op\_name \rangle
                ::=\langle id \rangle
```

```
41
          \langle id \rangle
                 ::= \langle letter \rangle \{ \langle alpha\_numeric \rangle \}
42
          \langle real\_literal \rangle
                  ::= \langle integer\_literal \rangle . \langle integer\_literal \rangle
43
          \langle integer\_literal \rangle
                 ::= \langle digit \rangle \{ \langle digit \rangle \}
44
          \langle string\_literal \rangle
                 ::= \text{ " } \{ \text{ $\langle char \rangle$ } \} \text{ "}
45
          \langle char \rangle
                 ::= any printable character except '}'
46
          \langle digit \rangle
                 ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
47
          \langle letter \rangle
                 ::= \  \, a \  \, | \  \, b \  \, | \  \, c \  \, | \  \, d \  \, | \  \, e \  \, | \  \, f \  \, | \  \, g \  \, | \  \, h \  \, | \  \, i \  \, | \  \, j \  \, | \  \, k \  \, | \  \, 1 \  \, | \  \, m
                       | n | o | p | q | r | s | t | u | v | w | x | y | z
                       | A | B | C | D | E | F | G | H | I | J | K | L | M
                       | N | O | P | Q | R | S | T | U | V | W | X | Y | Z
48
          \langle alpha\_numeric \rangle
                 ::= \langle letter \rangle
                       |\langle digit \rangle|
49
         \langle text \rangle
                 := \{ \langle char \rangle \}
```

APPENDIX B. PROTOTYPE EXAMPLE

Early in the development of the PSDL Editor, a small prototype created by Dr. Shing was used for testing purposes. This prototype consisted of a few operators, and hence did not present a sufficient test case for the PSDL Editor. The lack of size of Dr. Shing's prototype lead to the creation of an avionics_example prototype.

The goal of the avionics_example prototype was to use as many features of PSDL as possible and provide a medium to large size prototype to test the PSDL Editor. Since the PSDL Editor has limited facilities for types and generics, examples of these features were limited or non-existent. In addition, no attempt was made to test all combinations of expression evaluations.

In addition, no attempt was made to provide a full avionics suite. The example presented is not intended to reflect an actual avionics suite, although aspects of the prototype can be found in aircraft that are currently in the United States Air Force inventory.

1. ARCHITECTURE

Figure 55 represents the avionic suite that is modeled in the prototype. The avionic suite consists of a six subsystems: Fire Control System (FCS), Radar Sub-System (RSS), Navigation SubSystem (NSS), Weapon SubSystem (WSS), Display SubSystem (DSS), and the Mass-Storage Subsystem (MSS). The FCS contains two dual-redundant processors, FCS_1 and FCS_2. The RSS contains both a radar antenna and an inertial platform on the antenna, which can be used as a backup navigation source. Two bomb racks are provided in the WSS.

The avionic suite contains two data buses. One is used for the RSS and NSS. The other is used for the WSS, DSS and MSS. A single bus controller is used to coordinate all messages traveling over the buses. The FCS performs all bus controller activities. Since the FCS is dual-redundant, one FCS processor is designated as the

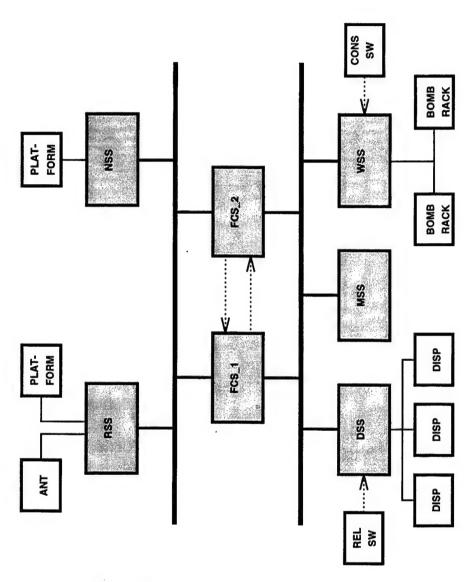


Figure 55. avionics_example Architecture

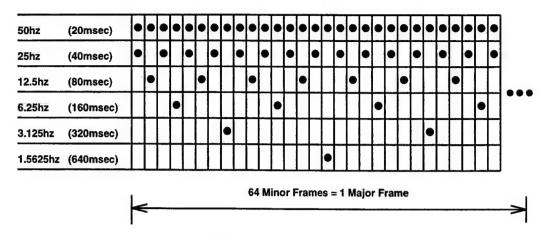


Figure 56. Minor Cycle Task Scheduling

bus controller while the other monitors the health of the bus controller. If the bus controller should fail, the second FCS processor takes over bus controller activities.

All tasks performed by the avionic suite are scheduled to be accomplished at different rates. The execution of each processor is divided into minor cycles and major cycles. For a typical avionic suite, the processors are executed at 50Hz. Thus, each minor cycle lasts for 20 milliseconds. A major cycle would consist of 64 minor cycles. All tasks are expected to be accomplished in a major cycle. During a minor cycle, tasks from two rate groups are performed. This is depicted in Figure 56 where each column represents a minor cycle. During each minor cycle, tasks from the 50Hz rate group and a slower rate group are performed.

2. MAPPING TO PSDL

Just as the design of an avionic suite would start with a high level diagram and decompose each component of the design, the prototype consists of a root operator, avionics_example, which is composed of a PSDL operator for each subsystem. In the case of the NSS, a simple pass-thru model will be used. No additional decomposition is required for a simple operator. Thus, the NSS is implemented in Ada. The other subsystems are more complex, and thus, are decomposed into a PSDL graph

implementation.

Although no software base is provided for this prototype to facilitate the execution of the prototype, two additional prototype components are required to complete the model. An environment_simulation operator is required to simulate the aircraft motion as well as the target environment and an air_vehicle_interface operator is required to facilitate the displays produced by the display_sub_system as well as providing a user interface for switch actions. Both of these operators are external to the avionic suite and are thus represented as terminators (square boxes) so that the execution time is not counted against the avionic suite.

For the purposes of this prototype, the timing model previously discussed is too complex. Instead, tasks will be accomplished at either 50Hz, 25Hz or 1Hz. Each subsystem that performs tasks at different rates contains a mode control operator which schedules the tasks.

In the actual avionic suite, each processor executes in parallel. Tasks within a processor are performed serially. While PSDL does not preclude the parallel execution of operators, CAPS Release 1 was implemented on a single processor. This prototype is also designed to be executed on a single processor. In order to maintain the desired execution rate of 50Hz, each subsystem is assigned an execution time which is a fraction of a minor cycle (reference Figure 57). Since the processing of each subsystem is simulated, the calculations performed can be greatly simplified in order meet the timing requirements.

3. PROTOTYPE

The decomposition of each PSDL operator for the avionics_example prototype is provided in Figures 58 through 64.

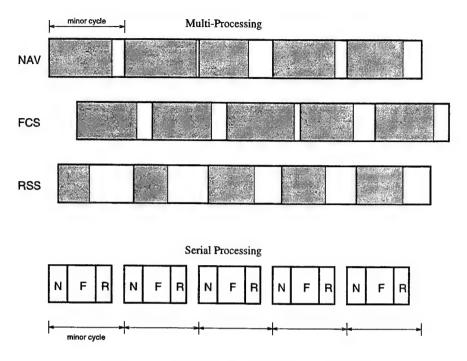


Figure 57. Serializing Multiple Processors

4. CAPS RELEASE 1 COMPATIBILITY

Although this implementation of the PSDL Editor incorporated changes to the CAPS Release 1 grammar, an attempt was made to schedule the prototype using CAPS Release 1^{27} . Before the prototype can be scheduled, a successful translation must be accomplished. It was found that the translator would not accept the **property** construct added to the PSDL grammar. Nor did the translator accept an implementation language other than Ada^{28} . The inclusion of operator and vertex identification numbers to the $\langle op_name \rangle$ also caused compatibility problems. Since the $\langle op_name \rangle$ provided in an $\langle operator \rangle$ $\langle component \rangle$ does not include the vertex identification number, where the $\langle op_id \rangle$'s used in the $\langle data_flow_diagram \rangle$ does,

²⁷Note that there is no implied compatibility of this implementation of the PSDL Editor with CAPS Release 1. This experiment was intended to identify compatibility issues.

²⁸The CAPS Release 1 PSDL Editor did not accept a mixed case Ada. An all upper case ADA was accepted. Additional problems encountered with the CAPS Release 1 PSDL Editor include the finish within construct and Missing_Info containing two underscores in succession

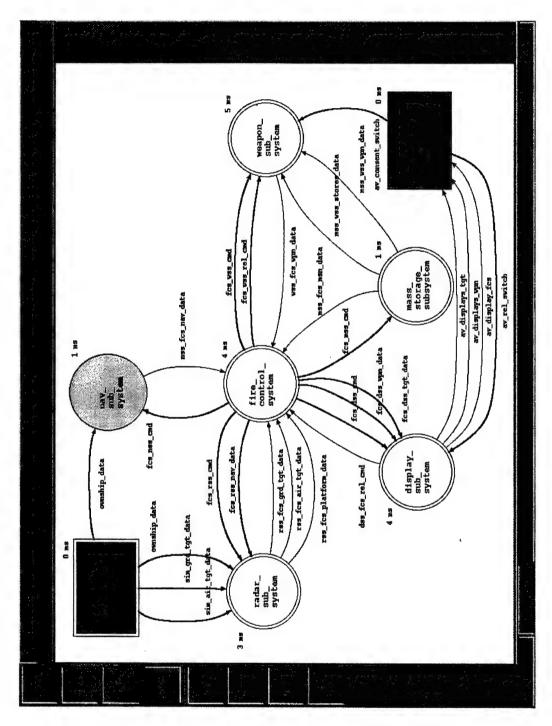
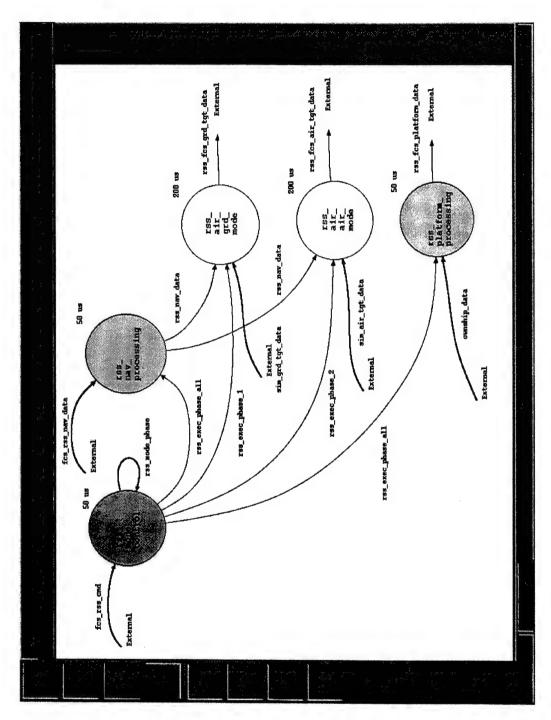


Figure 58. avionics_example Root Operator



 ${\bf Figure~59.~avionics_example~RSS~Operator}$

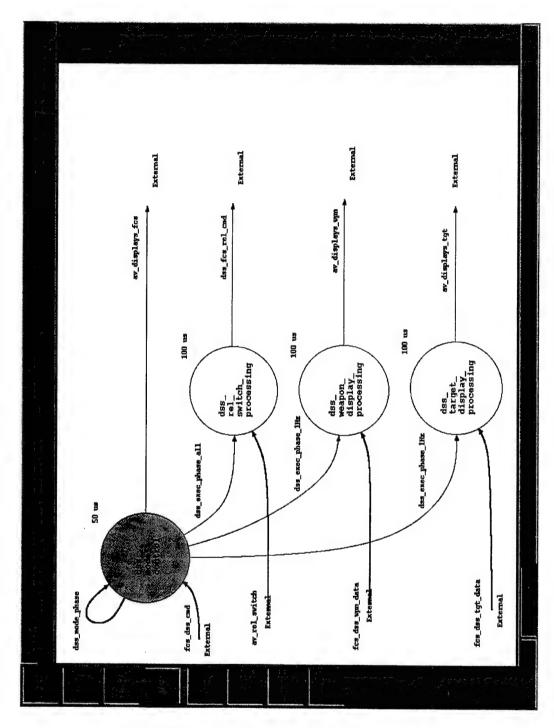


Figure 60. avionics_example DSS Operator

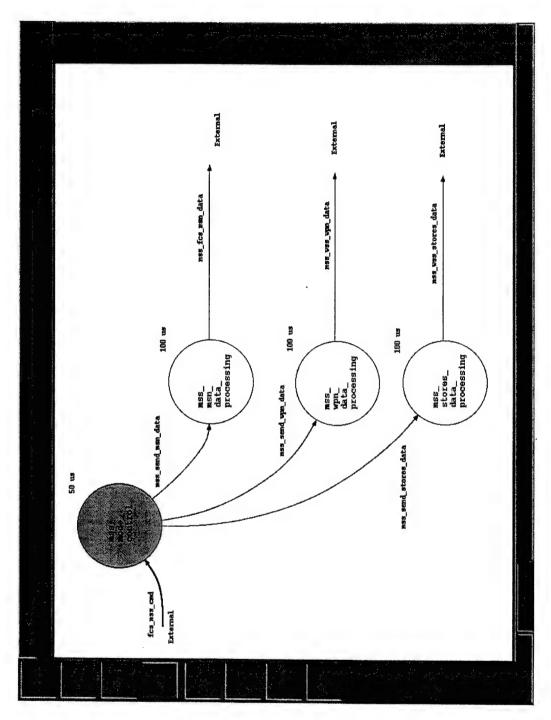


Figure 61. avionics_example MSS Operator

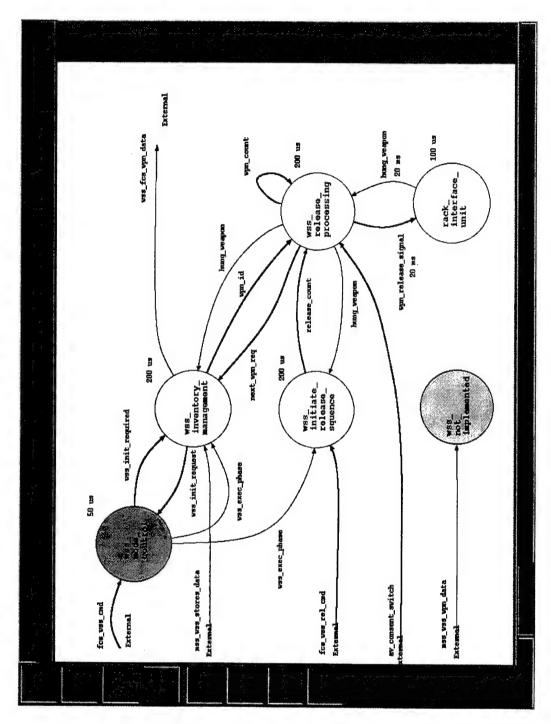


Figure 62. avionics_example WSS Operator

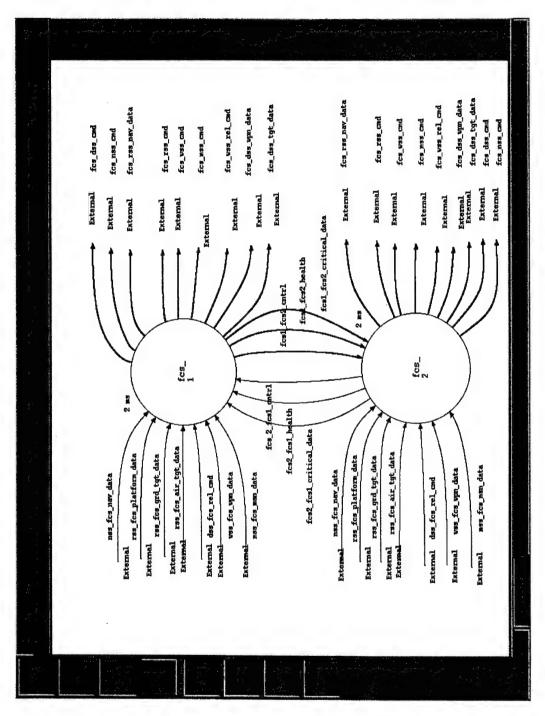


Figure 63. avionics_example FCS Operator

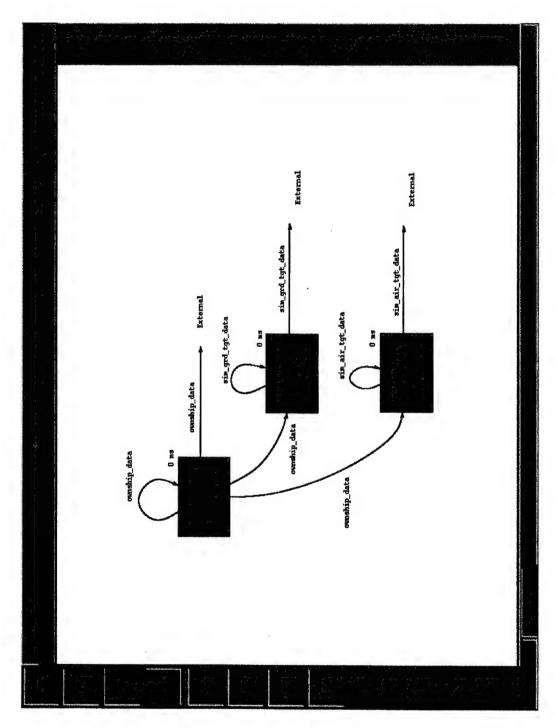


Figure 64. avionics_example Environment Operator

each of these $\langle operator \rangle$ $\langle component \rangle$'s are reported as multiple root operators.

After using a text editor to correct these problems, no additional errors were reported by the translator. However, this does not imply that there are no other compatibility issues. Only that no other errors were detected. At this point, the prototype was scheduled. Only one additional error was detected by the scheduler. The scheduler raised a TIME_INFO_ERROR exception for having a zero MET and a non-zero PERIOD.

No additional testing was performed beyond obtaining a valid schedule. However, additional compatibility issues probably still exist but not reported. The lack of operator and stream identification numbers within $\langle control_constrains \rangle$ will most likely cause additional problems.

5. LESSONS LEARNED

The early use of the avionics_example prototype in the development of the PSDL Editor was extremely beneficial. Problems were detected with the PSDL Editor that required major rework of the system while there was still time in the schedule to accommodate changes. Specifically, it was found that the PSDL Editor required a large amount of time to perform syntax checks and took an enormous amount of system memory. In addition, the protocol used to exchange information between the background checker and the graph editor failed for large prototypes. Neither of these problems were readily apparent from the use of smaller test cases.

In stepping from a small prototype to a large prototype, it was apparent that the PSDL Editor required too much time to traverse the prototype. It was typical to take 45 seconds to move from one level of the prototype to another. Timing analysis indicated that the largest component of this delay was due to updating the attribute tree maintained by the background checker, which uses Synthesizer Generator routines to maintain the attribute tree as in CAPS Release 1. However, each of these routines also updated the syntax-directed editor window, which resulted in even longer delays.

The syntax-directed editor window is not used in this version of the PSDL Editor, and thus resulted in wasted processor time. System performance was improved through the redesign of the background checker. A new Ada/C background checker, which did not use the Synthesizer Generator code, is now used to maintain the prototype data structure. This redesign resulted in greatly improved performance during the traversal of the prototype and significant improvements in the delays encountered during syntax checks and save operations.

In the process of working with the avionics_example, it was found that the syntax-directed editor reported being out of memory (virtual memory swap space). The problem appeared to be one of accumulation. The syntax-directed editor started with a reasonably sized workspace. However, as the user traversed the prototype, the memory requirements grew until the available swap space was no longer able to accommodate the program. This problem is now solved with the new background checker.

Between the background checker process and the graph editor process, two pipes are used to provide bidirectional communication. The protocol used to communicate worked fine for small prototypes. However, when the avionics_example prototype was used, this protocol fell apart. The error resulted from the maximum limit on the size of read and write operations on the pipe. Using the larger prototype, this limit was exceeded. A solution was obtained by transmitting the buffer used for inter-process communication using multiple packets of a maximum size reflective of the pipe limitations.

Besides these errors, modifications to the user interface were identified to improve user interaction. Once again, these modifications were identified after repeated use of the editor. They were not readily apparent from the entry of one or two operators.

6. AVIONICS EXAMPLE PSDL CODE

The following is the PSDL code generated by the PSDL Editor for the prototype avionics_example.

TYPE delta_tgt_format SPECIFICATION END IMPLEMENTATION Ada delta_tgt_format END	END TYPE initial_fcs_cntrl SPECIFICATION END
TYPE empty_inventory SPECIFICATION	IMPLEMENTATION Adm initial_fcs_cutrl
IMPLEMENTATION Ada empty_inventory END	TVPE initial_fcs_critical SPECIFICATION END
TYPE exception_type SPECIFICATION	IMPLEMENTATION Ada initial_fcs_critical END
END IMPLEMENTATION Ada exception_type END	TVPE initial_fcs_health SPECIFICATION END
TYPE fcs_cntrl_format SPECIFICATION	INFLEMENTALIUN AGR INICIAL_ICS_NOBALUN
END IMPLEMENTATION Ada fcs_cutrl_format END	TVPE initial_fes_status SPECIFICATION END
TYPE fos_critical_format SPECIFICATION FWD	INFLEMENTALIUN Ada initial_tcs_status END
IMPLEMENTATION Ada fos_critical_format END	TYPE initial_grd_target SPECIFICATION END TYPE
TYPE fcs_health_format SPECIFICATION END	END
IMPLEMENTATION Ada fcs_health_format END	TYPE initial_position SPECIFICATION END
TYPE fcs_status_format SPECIFICATION Fun	END
END IMPLEMENTATION Ada fcs_status_format END	TYPE msn_format SPECIFICATION END IMPLEMENTATION Ada msn format
TYPE initial_air_target SPECIFICATION	END
IMPLEMENTATION Adm initial_mir_target	TYPE nav_format

SPECIFICATION	END
END IMPLEMENTATION Ada nav_format	TYPE zero tgt_position
END	END ENDURATION AS tot continue
TYPE no_weapon_selected	INFLEMENTATION AGA ZOTO_UGC_POSICION
SPECIFICATION	END
IMPLEMENTATION Ada no_weapon_selected	OPERATOR air_vehicle_interface_2584
END	SPECIFICATION
TYPE BATE 1HZ	av_displays_wpn : wpn_format
SPECIFICATION	av_displays_tgt : delta_tgt_format
IMPLEMENTATION Ada Rate_1Hz	ANYOA AYAİSPLAY_İCS : fcs_status_format ANTONIT
END	DOLEAN RAYCODSent_switch : BUOLEAN OHTPOTT
TYPE Rate_25Hz SPECIFICATION	AVIOLEM ANTIHUM EXECUTION TIME O MS
END IMPLEMENTATION Ada Rate_25Hz	END IMPLEMENTATION TAE_PLUS air_vehicle_inte
END	END
TYPE stores_format SPECIFICATION EWN	OPERATOR avionics_example_2543 SPECIFICATION STATES
IMPLEMENTATION Ada stores_format	forms for desta : delta_tgt_forms INTTALLY
END	zero_tgt_position
TYPE upn_format SPECIFICATION	fies_das_cmd : fcs_status_format INITIALLY
END IMPLEMENTATION Ada won format	initial_fcs_status STATES
Child	fcs_nss_cmd : fcs_status_format
	initial_fos_status
TYPE wpm_id_format SPECIFICATION	STATES fcs_wss_r+l_cmd : BOOLEAN
END IMPLEMENTATION Ada vpn_id_format	INITIALLY FALSE
EMD	STATES STATES Av.rel_switch : BOOLEAN
TYPE zero_position	INITIALLY FALSE
SPECIFICATION	STATES
IMPLEMENTATION Ada zero_position	INITIALLY STATECH : BUGLERIN
	35.143

STATES	PROPERTY label font = 3
fcs_wss_cmd : fcs_status_format	PROPERTY label r offset = 37
INITIALLY	PROPERTY label_y_offset = 89
initial_fcs_status	PRUPERTY met_font = 2
STATES	PROPERTY met_x_offset = 123
fcs_mss_cmd : fcs_status_format	PROPERTY met_y_offset = 13
INITIALLY	PROPERTY is_terminator = FALSE
initial_fcs_status	
STATES	VERTEX weapon_sub_system_2579_2546 : 5
fcs_dss_wpn_data : wpn_format	PROPERTY x = 808
INITIALLY	PROPERTY $y = 287$
<pre>empty_inventory</pre>	PROPERTY radius = 64
STATES	PROPERTY color = 62
fcs_rss_nav_data : nav_format	PROPERTY label_font = 3
INITIALLY	PROPERTY label_r_offset = 34
zero_position	PROPERTY label_y_offset = 87
STATES	PROPERTY met_font = 2
fcs_rss_cmd : fcs_status_format	
INITIALLY	PROPERTY met_y_offset = 4
initial_fcs_status	PROPERTY is_terminator = FALSE
STATES	
sim_air_tgt_data : nav_format	VERTEX display_sub_system_2580_2547 : 4
INITIALLY	PROPERTY x = 255
initial_air_target	PROPERTY y = 543
STATES	PROPERTY radius = 64
sim_grd_tgt_data : nav_format	PROPERTY color = 62
INITIALLY	PROPERTY label_font = 3
initial_grd_target	PROPERTY label_x_offset = 28
STATES	PROPERTY label_y_offset = 85
ownship_data : nav_format	PROPERTY met_font = 2
INITIALLY	PROPERTY met_x_offset = - 25
initial_position	.PROPERTY met_y_offset = 22
END	PROPERTY is_terminator = FALSE
IMPLEMENTATION	
GRAPH	VERTEX mass_storage_subsystem_2581_2548
VERTEX radar_sub_system_2577_2544 : 3 MS	PROPERTY x = 566
PROPERTY $x = 56$	PROPERTY y = 541
PROPERTY $y = 285$	PROPERTY radius = 64
PROPERTY radius = 63	PROPERTY color = 62
PROPERTY color = 62	PROPERTY label_font = 3
PROPERTY label_font = 3	
label_x_offset	PROPERTY label_y_offset = 87
PROPERTY label_y_offset = 86	PROPERTY met_font = 2
	PROPERTY met_x_offset = 110
PROPERTY met_x_offset = - 34	PROPERTY met_y_offset = 5
PROPERTY met_y_offset = 28	PROPERTY is_terminator = FALSE
PROPERTY is_terminator = FALSE	
and the state of t	VERTEX fire_control_system_2582_2549 :
VEKIEK nav_suo_system_2578_2545 : 1 MS	PROPERTY x = 402
PRUPERLI W # 587	PROPERTY y = 280
PRUPERII $y = 23$ DEFINATION = 24	PROPERTY radius = 64
Profest Factor = 04	PRUPERIY COLOF = 62
PRIIDERTY COLOT = 53	DBODEBTV 1-1-1 - 2

W.

PROPERTY latency_y_offset = 0 PROPERTY spline = "182 169 182 262 PROPERTY latency_y_offset = 0 PROPERTY spline = "124 172 125 257 PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "69 161 68 260 " PROPERTY latency_y_offset = 15 PROPERTY spline = "356 306 241 306 PROPERTY latency_y_offset = 15 PROPERTY spline = "385 268 233 269 environment_simulation_2583_2550 -> radar_sub_system_2577_2544 environment_simulation_2583_2550 PROPERTY label_x_offset = - 48 fire_control_system_2582_2549 -> PROPERTY label_y_offset = - 7 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY label_font = 2 PROPERTY label_x_offset = 11 PROPERTY label_y_offset = 48 PROPERTY label_x_offset = 9 PROPERTY label_y_offset = 9 fire_control_system_2582_2549
radar_sub_system_2577_2544
PROPERTY id = 2559 PROPERTY latency_font = 2 PROPERTY label_font = 2 PROPERTY label_x_offset = PROPERTY label_y_offset = PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_font = 2 radar_sub_system_2577_2544 PROPERTY id = 2556 radar_sub_system_2577_2544 PROPERTY label_font = 2 PROPERTY label_font = 2 EDGE rss_fcs_grd_tgt_data PROPERTY id = 2557 PROPERTY id = 2558 EDGE sim_grd_tgt_data EDGE sim_air_tgt_data EDGE fcs_rss_nav_data EDGE fcs_rss_cmd VERTEX environment_simulation_2583_2550 : 0 MS VERTEX air_vehicle_interface_2584_2551 : 0 MS environment_simulation_2583_2550 -> environment_simulation_2583_2550 -> PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "237 57 361 56 PROPERTY label_y_offset = -49 PROPERTY latency_font = 2 PROPERTY is_terminator = FALSE PROPERTY label_y_offset = 25 PROPERTY met_y_offset = -8
PROPERTY is_terminator = TRUE PROPERTY label_x_offset = 2 PROPERTY met_y_offset = - 11 PROPERTY is_terminator = TRUE PROPERTY label_y_offset = 84 PROPERTY label_x_offset = 27 PROPERTY met_font = 2 PROPERTY met_x_offset = 107 PROPERTY met_y_offset = 6 PRUPERTY label_y_offset = 70 PROPERTY label_font = 2 PROPERTY label_x_offset = PROPERTY label_x_offset = 26 PROPERTY label_x_offset = 40 PROPERTY label_y_offset = 73 PROPERTY latency_font = 2 PROPERTY met_x_offset = 130 PROPERTY met_x_offset = 142 radar_sub_system_2577_2544 PROPERTY label_font = 2 nav_sub_system_2578_2545 PROPERTY id = 2554 PROPERTY label_font = 6 PROPERTY label_font = 6 PROPERTY met_font = 2 PROPERTY met_font = 2 PROPERTY radius = 54 PROPERTY radius = 54 PROPERTY id = 2555 PROPERTY color = 7 PROPERTY color = 7 PROPERTY x = 788 PROPERTY y = 557PROPERTY x = 43PROPERTY y = 30 EDGE ownship_data EDGE ownship_data

PROPERTY label_y_offset = 52	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PRODERTY latency v offset = 15	DRODERTY STILL ALLE AND KAT	por orr our a suride surrous		EDGE fcs_mss_cmd	fire_control_system_2582_2549 ->	mass_storage_subsystem_2581_2548	PROPERTY 1d = 2565	COOR - TI STEELING - TI STEELING	PROPERTY label_x_offset = 0	PROPERTY label v offset = 0	DRIDERTY latency font = 2	C - TOTAL CONTROL STREET	TAUFEAL LACORCY, X_OLISOC = O	PROPERTY LACENCY_Y_DIESEC = 10	on one one a suite inglove	Service and ROCK	V- 043C CSSC metapas Control evit		CEONTS OF THE PROPERTY OF THE	C - thing tringing	PROFESTI LABOL 1 A CASACA - A A A CASACA - A A A A A A A A A A A A A A A A A) 	G = 20SIIO K TROUT INTOUNA	PRUPERTY Intency_tont = 2	FAUFERII Intency_x_oilset = U	PRUPERIT Latency_y_ortset = 15	FRUPERII Spiine = "561 298 752 299		EDGE wss_fcs_wpn_data	weapon_sub_system_2579_2546 ->	fire_control_system_2582_2549	PROPERTY id = 2568	PROPERTY label_font = 2	PROPERTY label_x_offset = - 64	PROPERTY label_y_offset = 19	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency y offset = 0	PROPERTY spline = "760 385 596 382		EDGE mss_wss_ctores_data	mass_storage_subsystem_2581_2548 ->	weapon sub system 2579 2546	PROPERTY id = 2569	PROPERTY label font = 2	PROPERTY label x offset = 10		PRUPERTY label v offset = 11	PROPERTY label_y_offset = 11 PROPERTY latency font = 2	PROPERTY label_y_offset = 11 PROPERTY latency_fout = 2 DRODDRAY latency v offset = 0
radar_sub_system_2577_2544 ->	fire_control_system_2582_2549	PROPERTY id = 2560	PROPERTY label_font = 2	PROPERTY label x offset = - 69	1 1 1	PRUPERIT Tabel_y_ottset = 1/	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 0	PROPERTY spline = "212 365 358 364 "		EDGE rss_fcs_air_tgt_data	radar_sub_system_2577_2544 ->	fire_control_system 2582 2549	PROPERTY 1d = 2561	PANDERTY Jahal fort = 0	PROPERTY label + offert = AO	14	PROPERTY latency font = 2	PROPERTY latency x offset = 0	PROPERTY latency v offset = 0	PROPERTY spline = "216 399 345 398 "		EDGE res for platform data	radar and system OR77 ORAS ->	Attached and and and and and and and and and an	DDODERTY : 4 - DEAD	PROPERTY 1-1-1 4-1-1		TAUTEMENT LABOR 1. 100 CO. 100	PRUPERIY Label_y_offset = 18	PRUPERIY Latency_font = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "217 437 362 436 "		EDGE dss_fcs_rel_cmd	display_sub_system_2580_2547 ->	fire_control_system_2582_2549	PROPERTY id = 2563	PROPERTY label_font = 2	PROPERTY label_x_offset = - 140	4	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 0	PROPERTY spline = "340 515 391 430 "		EDGE fcs_dss_wpn_data	fire_control_system 2582 2549 ->		display_sub_system_2580_2547	display_sub_system_2580_2547 PROPERTY id = 2564

	PROPERTY label font = 2
EDGE av_consent_switch	PROPERTY label_x_offset = - 33
air_vehicle_interface_2584_2551 ->	11
weapon_sub_system_2579_2546	
PROPERTY id = 2571	PROPERTY latency_x_offset = 0
PROPERTY label_font = 2	PROPERTY latency_y_offset = 15
PROPERTY label_x_offset = - 138	PROPERTY spline = "553 327 714 324 "
PROPERTY label_y_offset = 60	
PROPERTY latency_font = 2	EDGE fcs_nss_cmd
PROPERTY latency_x_offset = 0	fire_control_system_2582_2549 ->
PROPERTY latency_y_offset = 15	nav_sub_system_2578_2545
PROPERTY spline = "925 523 923 444 "	PROPERTY id = 2746
	PROPERTY label_font = 2
EDGE av_rel_switch	PROPERTY label_x_offset = -86
air_vehicle_interface_2584_2551 ->	PROPERTY label_y_offset = - 49
display_sub_system_2580_2547	
PROPERTY id = 2572	PROPERTY latency_x_offset = 0
PROPERTY label_x_offset = - 37	PROPERTY spline = "409 244 408 175 "
PROPERTY label_y_offset = 17	
PROPERTY latency_font = 2	EDGE fcs_dss_cmd
PROPERTY latency_r_offset = 0	fire_control_system_2682_2649 ->
PROPERTY latency_y_offset = 15	display_sub_system_2580_2547
PROPERTY spline = "825 723 744 743 450 744 391 720 "	PROPERTY id = 2747
EDGE av_displays_wpn	п
display_sub_system_2580_2547 ->	PROPERTY label_y_offset = 21
air_vehicle_interface_2584_2551	
PROPERTY id = 2573	PROPERTY latency_x_offset = 0
PROPERTY label_x_offset = -69	PROPERTY spline = "430 437 378 534 "
PROPERTY label_y_offset = 15	
PROPERTY latency_font = 2	EDGE mss_fcs_msn_data
PROPERTY latency_r_offset = 0	mass_storage_subsystem_2581_2548 ->
	fire_control_system_2582_2549
PROPERTY spline = "398 680 452 698 756 695 789 679 "	PROPERTY id = 2798
	PROPERTY label_font = 2
EDGE nss_fcs_nav_data	PROPERTY label_x_offset = 0
nav_sub_system_2578_2545 ->	PROPERTY label_y_offset = 0
fire_control_system_2582_2549	PROPERTY latency_font = 2
PROPERTY id = 2574	PROPERTY latency_x_offset = 0
PROPERTY label_font = 2	PROPERTY latency_y_offset = 0
PROPERTY label_x_offset = 12	PROPERTY spline = "618 496 546 399 "
PROPERTY label_y_offset = 1	
PROPERTY latency_font = 2	EDGE fcs_dss_tgt_data
PROPERTY latency_x_offset = 0	fire_control_system_2582_2549 ->
PROPERTY latency_y_offset = 0	display_sub_system_2580_2547
PROPERTY spline = "495 180 496 247 "	PROPERTY id = 2826
	1
	1
Ilre_control_system_2082_2049 ->	PRUPERTY LABOL_y_offset = 66
#eapon_sub_system_25/9_2546	PRUPERTY latency_font = 2
DKIDERIY 14 = 2012	CMIDENTY DEFENDE 4 SAFER II C

```
VERTEX dss_weapon_display_processing_2677_2667 : 100 MICROSEC
                                                                                                                                                                                                                                   OPERATOR mass_storage_subsystem_2581_2548
                                                                                                                                                                                                                                                                                                                                         OPERATOR environment_simulation_2583_2550
                                                                                                                                                                                                                                                                                                                                                                                                                          OPERATOR air_vehicle_interface_2584_2551
                                                                                                                                                                                                                                                                                        OPERATOR fire_control_system_2582_2549
                                                                                                                                                                                 OPERATOR display_sub_system_2580_2547
                                                                                                                                OPERATOR weapon_sub_system_2579_2546
                              OPERATOR radar_sub_system_2577_2544
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                fcs_dss_tgt_data : delta_tgt_format
                                                                              OPERATOR nav_sub_system_2578_2545
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        av_displays_tgt : delta_tgt_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            av_display_fcs : fcs_status_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            fcs_dss_cmd : fcs_status_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             fcs_dss_wpn_data : wpn_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY label_x_offset = 32
PROPERTY label_y_offset = 105
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      av_displays_wpn : wpn_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OPERATOR display_sub_system_2580
SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  dss_fcs_rel_cmd : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 dss_mode_phase : Rate_1Hz
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        MAXIMUM EXECUTION TIME 4 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 av_rel_switch : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_font = 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY radius = 75
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY color = 62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY x = 383
                                                                                                                                                                                                                                                                                                                                                                      PERIOD 20 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IMPLEMENTATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               DUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                    END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY latency_y_offset = 15
PROPERTY spline = "394 696 428 706 472 720 715 718 782 705 821 682 "
PROPERTY latency_v_offset = 15
PROPERTY spline = "480 461 457 525 421 563 "
                                                                                                                                                                                                                                                                                                             PROPERTY latency_y_offset = 0
PROPERTY spline = "410 663 466 676 734 676 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY latency_y_offset = 15
PROPERTY spline = "719 557 836 451 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            rss_fcs_air_tgt_data : delta_tgt_format,
rss_fcs_grd_tgt_data : delta_tgt_format
CDNTROL CDNSTRAINTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                mass_storage_subsystem_2581_2548 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     av_display_fcs : fcs_status_format,
av_displays_tgt : delta_tgt_format,
mss_fcs_msn_data : msn_format,
nss_fcs_nav_data : nav_format,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      mss_wss_stores_data : stores_format,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  rss_fcs_platform_data : nav_format,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                              PROPERTY latency_x_offset = 0
                                                                       EDGE av_displays_tgt
display_sub_system_2580_2547 ->
air_vehicle_interface_2584_2551
                                                                                                                                                                                                                                                                                                                                                                                                                 display_sub_system_2580_2547 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                  air_vehicle_interface_2584_2551
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY id = 2764
PROPERTY label_font = 2
PROPERTY label_x_offset = -
PROPERTY label_y_offset = 14
                                                                                                                                                                                                                            PROPERTY label_y_offset = 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY label_font = 2
PROPERTY label_x_offset = 5
PROPERTY label_y_offset = 14
                                                                                                                                                                                                         PROPERTY label_x_offset = 79
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                wss_fcs_wpn_data : wpn_format,
                                                                                                                                                                                                                                                           PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        weapon_sub_system_2579_2546
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              av_displays_wpn : wpn_format,
                                                                                                                                                     PROPERTY id = 2834
PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              mss_wss_wpn_data : BOOLEAN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       dss_fcs_rel_cmd : BOOLEAN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY id = 2787
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EDGE mss_wss_wpn_data
                                                                                                                                                                                                                                                                                                                                                                                              EDGE av_display_fcs
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DATA STREAM
```

PROPERTY latency_y_offset = 0 PROPERTY spline = "89 357 316 357 363 343 "	EDGE das_fcs_rel_cmd	EXTERNAL	PROPERTY id = 2670	PROPERTY label_font = 2	w	PROPERTY label_y_offset = - 10	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "562 293 768 294 "	The state of the s	EDGE TOS MULTORES	dss_weapon_display_processing_2677_2667	PROPERTY id = 2671			PROPERTY label_y_offset = -19		PROPERTY latency_x_offset = 0	0 =	PROPERTY spline = "101 526 241 526 354 527 "		EDGE av_displays_wpn	dss_weapon_display_processing_2677_2667 ->	EXTERNAL	PROPERTY id = 2672	PROPERTY label_font = 2	e B II	PRUPERTY label_y_offset = -11	Phupehii latency_ront = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "589 480 776 481 "		EDGE dss_exec_phase_all	dss_mode_control_26/9_26/3 ->	dss_rel_switch_processing_2678_2668	PROPERTY id = 2674	PROPERTY label_font = 2	li	PROPERTY label_y_offset = - 53	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 15	PROPERTY spline = "262 290 348 299 "	•	EDGE dss_exec_phase_iHz	das mode control 2679 2673 ->
PROPERTY met_font = 2 PROPERTY met_x_offset = 129 PROPERTY met v_offset = -5		VERTEX dss_rel_switch_processing_2678_2668 : 100 MICROSEC	PROPERTY $x = 382$	PROPERTY $y = 222$	PROPERTY radius = 74	PROPERTY color = 62	PROPERTY label_font = 3 .	PROPERTY label_x_offset = 31	PROPERTY label_y_offset = 104	PROPERTY met_font = 2	PROPERTY met_x_offset = 127	PRODERTY is terminator = FALCE		VERTEX dss_mode_control_2679_2673 : 50 MICROSEC	PROPERTY $x = 101$	PROPERTY $y = 73$	PROPERTY radius = 75	PROPERTY color = 28	PROPERTY label_font = 3	PROPERTY label_x_offset = 47	PRUPERTY label_y_offset = 98	PROPERTY met_font = 2	PROPERTY met_x_offset = 133	PROPERTY met_y_offset = -5	PROPERTY is_terminator = FALSE		VERIEX dss_target_display_processing_2833_2827 : 100 MICROSEC	PRUPERTY x = 386	PROPERTY y = 592	PRUPERIY radius = //	PROPERTY color = 62	PROPERTY label_font = 3	PROPERTY label_x_offset = 34	PROPERTY label_y_offset = 106	PROPERTY met_font = 2		PROPERTY met_y_offset = - 5	PROPERTY is_terminator = FALSE		EDGE av_rel_switch	EXTERNAL ->	dss_rel_switch_processing_2678_2668	PROPERTY id = 2669			PROPERTY label_y_offset = - 13	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0

PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "94 731 298 7723	EDGE fcs_dss_cmd EXTERNAL -> dss_mode_control_2679_2673 PROPERTY id = 2832	PROPERTY label_ront = 2 PROPERTY label_r_offset = -85 PROPERTY label_y_offset = -10 PROPERTY latency_fout = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0	EDGE av_displays_fcs EDGE av_displays_fcs dss_mode_control_2679_2673 -> EXTERNAL PROPERTY id = 2763 PROPERTY id = 2763	PROPERTY Label_x_offset = 133 PROPERTY Label_x_offset = -15 PROPERTY Latency_font = 2 PROPERTY Latency_x_offset = 0 PROPERTY Latency_x_offset = 0 PROPERTY Latency_y_offset = 15 PROPERTY Spline = "508 148 763 149"	DATA STREAM av_displays_fcs : fcs_status_format, dss_axec_phase_llz : BOOLEAN, dss_axe_tophase_all : BOOLEAN CONTROL CONSTRAINS	OPERATOR dss_weapon_display_processing_2677. MINIMUM CALLING PERIOD 20 MS	UFERAIUR GES_FAL_SWICED_FOGESSING_2078_2008 MINIMUM CALLING PERIOD 20 MS TRIGGERED BY ALL fcs_dss_cmd MINIMUM CALLING PERIOD 20 MS	UOIFOI dss_exec_phase_all IF TRUE OUTPUT dss_mode_phase = 49
dss_weapon_display_processing_2677_2667 PROPERTY id = 2675 PROPERTY label_fout = 2 PROPERTY label_cost = 17 PROPERTY label_voffset = 17 PROPERTY label_voffset = 11	PROPERTY latency_font = 2 PROPERTY latency_k_offset = 0 PROPERTY latency_y_offset = 15 PROPERTY spline = "227 330 317 465"	EDGE dss_mode_phase dss_mode_control_2679_2673 -> dss_mode_control_2679_2673 PROPERTY id = 2676 PROPERTY label font = 2	PROPERTY label_x offset = -48 PROPERTY label_y_offset = -8 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "64 91 69 45 105 52 "	EDGE av_displays_tgt dss_target_display_processing_2833_2827 -> EXTERNAL PROPERTY id = 2828 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_x_offset = 48 PROPERTY label_x_offset = -14	PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 15 PROPERTY spline = "575 667 765 667 "	EDGE dss_exec_phase_1Hz dss_mode_control_2679_2673 -> dss_target_display_processing_2833_2827 PROPERTY id = 28939	PROPERTY label_x_offset = 60 PROPERTY label_y_offset = 40 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 15 PROPERTY spline = "179 364 202 576 305 672 "	EDGE fcs_dss_tgt_data EXTERNAL -> dss_target_display_processing_2833_2827 PROPERTY id = 2831 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2

UPERATUR des_target_display_processing_2833_2827	SPECIFICATION
END TENEDUCING FEBRUARY SO IIS	fcs_dss_wpn_data : wpn_format
	TOWN
OPERATOR dss_mode_control_2679 SPECIFICATION	dss_exec_phase_1Hz : BUULEAN OUTPUT
INPUL	av_displays_wpn : wpn_format
dss_mode_phase : Rate_1Mz	MAXIMUM EXECUTION TIME 100 MICROSEC
des des cond . Ses states facility	ENU TANDIDADATATION ADA dem means display processing 2677
TOB CASE CHECK TO LOS STRONGS LOTHER COURS LOS HER COURS L	THE PERSONAL AND GRADE G
dss_exec_phase_all : BOOLEAN	END
dss_exec_phase_iHz : BOOLEAN	OPERATOR env_ownship_position_2625
OUTPUT	SPECIFICATION
dss_mode_phase : Rate_1Hz OUTPUT	INPUT ownship_data : nav_format
av_displays_fcs : fcs_status_format	OUTPUT
MAXIMUM EXECUTION TIME 50 MICROSEC	ownship_data : nav_format MAXIMUM EXECUTION TIME O MS
INPLEMENTATION ADA dss_mode_control_2679	END
END	IMPLEMENTALLUM ADA SDV_OWDSDAP_POSITIOD_ZOZO
	END
OPERATOR dss_rel_switch_processing_2678 SECIFICATION	OPERATOR env_simulated_air_target_2627
INPUT	SPECIFICATION
av_rel_switch : BOOLEAN	INPUT
das exec phase all : BOOLEAN	INDIN
OUTPUT	sim_air_tgt_data : nav_format
dss_fcs_rel_cmd : BOOLEAN	OUTPUT
MAXIMUM EAECUTION TIME 100 MICROSEC	sim_air_tgt_data : nav_format MAXIMUM EXECUTION TIME O MS
IMPLEMENTATION ADA das_rel_switch_processing_2678	END
THE STATE OF THE S	IMPLEMENTATION ADA env_simulated_air_target_2627
	END
OPERATOR dss_target_display_processing_2833	
SPECIFICATION	UPERATUR env_simulated_ground_target_2526 SPECIFICATION
dss_exec_phase_1Hz : BOOLEAN	INPUT
INPUT	ownship_data : nav_format
fcs_dss_tgt_data : delta_tgt_format nnrpnr	INPUT sim grd tot data : nav format
av_displays_tgt : delta_tgt_format	OUTPUT
MAXIMUM EXECUTION TIME 100 MICROSEC	sim_grd_tgt_data : nav_format MAXIMIM EXECUTION TIME O MS
IMPLEMENTATION ADA dss_target_display_processing_2833	KEYHORDS
END	Environment, state_vector DESCRIPTION
TESC and the first test of a section of a se	{**** Flat earth air vehicle simulation: This operator will provide the animal and terms with a densmic six making this
UPERAIUR GSS_Weapon_Gispiay_processing_20//	

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/ERTEX env_simulated_ground_target_2626_2614 : 0 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       VERTEX env_simulated_air_target_2627_2615 : 0 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY latency_v_offset = 15
PROPERTY spline = "232 164 271 124 319 160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  env_simulated_ground_target_2626_2614
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               env_ownship_position_2625_2613 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  env_ownship_position_2625_2613 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY label_x_offset = 25

PROPERTY label_y_offset = 73

PROPERTY met_font = 2

PROPERTY met_x_offset = 110

PROPERTY met_y_offset = -6

PROPERTY is_terminator = TRUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   env_ownship_position_2625_2613
PROPERTY id = 2617
                                                                                                                                                                                                                                                                         PROPERTY is_terminator = TRUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY label_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY label_y_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY is_terminator = TRUE
                                                                                                                                                       PROPERTY label_y_offset = 63
                                                                                                                                                                                                                                                PROPERTY met_y_offset = -8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY label_x_offset = 21
PROPERTY label_y_offset = 73
PROPERTY met_font = 2
                                                                                                                         PROPERTY label_x_offset = 27
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY met_y_offset = -8
                                                                                                                                                                                                                   PROPERTY met_x_offset = 116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY met_x_offset = 109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY label_font = 2
                                                                PROPERTY color = 7
PROPERTY label_font = 6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY label_font = 6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY label_font = 6
                                                                                                                                                                                     PROPERTY met_font = 2
                                   PROPERTY radius = 44
                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY radius = 44
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY radius = 44
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PROPERTY id = 2618
                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY color = 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY color = 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY y = 542
                                                                                                                                                                                                                                                                                                                                                                     PROPERTY x = 421
                                                                                                                                                                                                                                                                                                                                                                                             PROPERTY y = 351
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY x = 423
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EDGE ownship_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EDGE ownship_data
                                                                                                                                               **** The coordinate system used operator will be based on a flat earth. X is positive East, Y is positive North, Z is positive Up. Heading will be measured from the X axis, positive Counter-Clockwise. }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              operate the avionics prototype. Since the operations performed
by this operator do not correspond to processing performed, but
instead are a simulation of a physical process, the execution
dynamic motion will be simulated, the course taken by the air vehicle will be static. This model provides for a constant flight heading, velocity, and altitude. No accelerations,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       simulation, earth_model, ground_target_model, air_target_model,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (This operator provides the environment simulation in order to
                                                                                            translational or rotational, will be available to the flight
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         This model is only applicable to the Northern Hemisphere. The ground is at Z\,=\,0. }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     A flat earth model is used throughout this simulation.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         IMPLEMENTATION ADA env_simulated_ground_target_2626
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     VERTEX env_ownship_position_2625_2613 : 0 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          time of the operator is not counted.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OPERATOR environment_simulation_2583
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     sim_air_tgt_data : nav_format MAXIMUM EXECUTION TIME O MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sim_grd_tgt_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ownship_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                        velocity = constant }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GroundTarget(Z) = 0 }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          flat_earth, periodic
                                                                                                                                                                                                                                                                                                 Heading = constant
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AirTarget(Z) >= 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0 =< (Z)diusumO}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY x = 214
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                --> North,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   X ---> East,
                                                                                                                                                                                                                                                                                                                                                               Pitch = 0
                                                                                                                                                                                                                                                                                                                               Roll = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DESCRIPTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IMPLEMENTATION
                                                                                                                                                                                                                                                                      0 < Z}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SPECIFICATION
                                                                                                                         path.
                                                                                                                                                                                                                                           AXIOMS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GRAPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ENG
```

OPERATOR env_simulated_ground_target_2626_2614 TRIGGERED BY ALL PROPERTY latency_r_offset = 0 PROPERTY spline = "458 517 478 483 504 509 PROPERTY latency_y_offset = 0 PROPERTY spline = "448 313 469 286 509 302 OPERATOR env_simulated_air_target_2627_2615 env_simulated_ground_target_2626_2614 -> OPERATOR env_ownship_position_2625_2613 rss_fcs_air_tgt_data : delta_tgt_format INPUT EDGE sim_air_tgt_data env_simulated_air_target_2627_2615 -> env_simulated_air_target_2627_2615 env_simulated_ground_target_2626_2614 PROPERTY id = 2624 MINIMUM CALLING PERIOD 20 MS MAXIMUM RESPONSE TIME 100 MICROSEC PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY label_font = 2 PROPERTY label_x_offset = 0 PROPERTY label_y_offset = 0 MINIMUM CALLING PERIOD 20 MS PRUPERTY label_x_offset = 0 PROPERTY label_y_offset = 0 PERIOD 20 MS FINISH WITHIN 200 MICROSEC PROPERTY latency_font = 2 PROPERTY latency_font = 2 FINISH WITHIN 100 MICROSEC PRUPERTY label_font = 2 PROPERTY id = 2623 EDGE sim_grd_tgt_data TRIGGERED BY ALL ownship_data ownship_data CONTROL CONSTRAINTS PERIOD 20 MS OPERATOR fcs_1_2666 SPECIFICATION IF FALSE PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "282 366 321 481 385 575 " env_simulated_ground_target_2626_2614 -> PROPERTY latency_y_offset = 0 PROPERTY spline = "330 347 396 383 " PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 15 PROPERTY spline = "663 581 734 582 " PROPERTY latency_y_offset = 15 PROPERTY spline = "560 391 737 392 " env_simulated_air_target_2627_2615 -> env_simulated_air_target_2627_2615 PROPERTY label_x_offset = - 92 env_ownship_position_2625_2613 -> env_ownship_position_2625_2613 -> PROPERTY label_y_offset = - 11 PROPERTY label_y_offset = -8 PROPERTY label_y_offset = - 9 PROPERTY latency_x_offset = 0 PROPERTY label_y_offset = 10 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY label_x_offset = 21 PROPERTY label_font = 2 PROPERTY label_x_offset = 33 PROPERTY label_r_offset = 29 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY id = 2619 PROPERTY id = 2620 EDGE sim_air_tgt_data PROPERTY id = 2622 PROPERTY id = 2621 EDGE sim_grd_tgt_data EDGE ownship_data EDGE ownship_data EXTERNAL EXTERNAL EXTERNAL

PROPERTY latency_y_offset = 15 PROPERTY spline = "354 240 532 240 "

PROPERTY label_font = 2 PROPERTY label_x_offset = -45 PROPERTY label_y_offset = 36

rss_fcs_grd_tgt_data : delta_tgt_format	INPUT
INPUT	rss_fcs_platform_data : nav_format
rss_rcs_platiorm_data : nav_rormat	INPUT
dss_fcs_rel_cmd : BOOLEAN	INPUT
INPUT	dss_fcs_rel_cmd : BODLEAN
wss_fcs_wpn_data : wpn_format	INPUT
INPUT	wss_fcs_wpn_data : wpn_format
mss_fcs_msn_data : msn_format	INPUT
nss fcs nav data : nav format	TOPITOT : WAR TORNING IN MADE
INPUT	fcsl_fcs2_cntrl : fcs_cntrl_format
fcs_2_fcs1_cntrl : fcs_cntrl_format	INPUT
INPUT	fcs1_fcs2_health : fcs_health_format
<pre>fcs2_fcs1_health : fcs_health_format INPUT</pre>	INPUT feat feat critical data : fea critical fo
fcs2_fcs1_critical_data : fcs_critical_format	OUTPUT
OUTPUT for one and a for status formst	fcs_wss_cmd : fcs_status_format
	fos res cmd : fos status format
fcs_rss_cmd : fcs_status_format	OUTPUT
DOTPUT	fcs_rss_nav_data : nav_format
ICS_FSS_DaV_data : DaV_IOFMat	COTPOI fre mee rmd . fre statue formet
fcs_mss_cmd : fcs_status_format	UTPUT TOTAL
DUTPUT	fcs_dss_wpn_data : wpn_format
fcs_dss_wpn_data : wpn_format	OUTPUT
fcs1_fcs2_cutrl : fcs_cutrl_format	ICS_L_ICSI_CRVII : ICS_CRVIL_IOFMAT OUTPUT
OUTPUT	fcs2_fcs1_health : fcs_health_format
fcs1_fcs2_health : fcs_health_format	OUTPUT
UUIPUI fos1 fos2 critical data : fos critical format	<pre>fcs2_fcs1_critical_data : fcs_critical_fo OHTPHT</pre>
TUGTIO	fcs_dss_tgt_data : delta_tgt_format
fcs_dss_tgt_data : delta_tgt_format	OUTPUT
TOTTO	fcs_dss_cmd : fcs_status_format
<pre>fcs_nss_cmd : fcs_status_format Output</pre>	OUTPUT fcs nss cmd : fcs status format
fcs_dss_cmd : fcs_status_format	OUTPUT
OUTPUT	fcs_wss_rel_cmd : BOOLEAN
fcs_wss_rel_cmd : BOOLEAN	MAXIMUM EXECUTION TIME 2 MS
	THDIENENTATION ADA FC. O ORGE
IMPLEMENTATION ADA fcs_1_2666	ייין התוניהיי ארא ירסייקייי ארא ירסייקייי
END	END
	OPERATOR fire_control_system_2582
OPERATOR fcs_2_2665	SPECIFICATION
INPUT	INPUI res for ord tot data : dalta tot format
rss_fcs_air_tgt_data : delta_tgt_format	LOANI
INPUT	rss_fcs_air_tgt_data : delta_tgt_format
rss_fcs_grd_tgt_data : delta_tgt_format	INPUT

rss_fcs_platform_data : nav_format npur	PROPERTY met_y_offset = 0 PROPERTY is terminator = FALSE
dss_fcs_rel_cmd : BOOLEAN	
use fos won data : won format	VEKIEK ICS_1_2000_2029 : 2 MS PROPERTY x = 387
INDIA	PROPERTY y = 131
nss_fcs_nav_data : nav_format	PROPERTY radius = 89 DENDERTY color = 62
roi mss_fcs_msn_data : msn_format	PROPERTY label_font = 3
DUTPUT	PROPERTY label_x_offset = 72
fcs_rss_cmd : fcs_status_format	PROPERTY label_y_offset = 105 PROPERTY met font = 2
fcs_rss_nav_data : nav_format	
DUTPUT	PROPERTY met_y_offset = -2
fcs_dss_wpn_data : wpn_format DUTPUT	PROPERTY is_terminator = FALSE
fcs_mss_cmd : fcs_status_format	EDGE rss_fcs_air_tgt_data EXTERNAL ->
fcs_wss_cmd : fcs_status_format	fcs_1_2666_2629
fos_wss_rel_cmd : BOOLEAN	FRUPERTY label_font = 2
DUTPUT	I B
fcs_nss_cmd : fcs_status_format	PROPERTY label_y_offset = -7 PROPERTY latency font = 2
fcs_dss_cmd : fcs_status_format	PROPERTY latency_x_offset = 0
DUTPUT	PROPERTY latency_y_offset = 0
fcs_dss_tgt_data : delta_tgt_format	PROPERTY spline = "167 220 254 220 342 218 "
Arts fcsl_fcs2_critical_data : fcs_critical_format	EDGE rss_fcs_grd_tgt_data
INITIALLY	EXTERNAL ->
initial_fcs_critical	fcs_1_2666_2629
STATES	PROPERTY id = 2631
ICSI_ICSZ_Demith : ICS_Demith_IOTENT	PROPERTY label = 0 106
initial_fcs_health	H
STATES	PROPERTY latency_font = 2
fcs1_fcs2_cntrl : fcs_cntrl_format	PROPERTY latency_r_offset = 0
initial_fcs_cntrl	PROPERTY spline = "164 188 252 187 355 187 "
MAXIMUM EXECUTION TIME 4 MS	
	EDGE rss_fcs_platform_data
IPLEMENTATION	EXTERNAL ->
UERTET FCR 2 2665 2628 : 2 MS	ICS_1_2000_1029 PROPERTY id = 2632
PROPERTY x = 392	PROPERTY label_font = 2
PROPERTY $y = 522$	н
PROPERTY radius = 92	PRUPERTY label_y_offset = - 11
PRUPERTY COLOR = 62	PRUPERIT Latency_ront == 2
PROFEST LABELLIONS = 3	PRODERTY latency to offset = 0
PROPERTY label_y_offset = 112	PROPERTY spline = "160 148 294 147 373 155 "
PROPERTY met_font = 2	
PROPERTY met_x_offset * 160	EDGE dss_fcs_rel_cmd

EXTERNAL ->	PROPERTY label_y_offset = -9
fcs_1_2666_2629	PROPERTY latency_font = 2
PRUPERTY 1d = 2633	PROPERTY latency_x_offset = 0
	PROPERTY latency_y_offset = 0
PROPERTY label_x_offset = ~ 115	PROPERTY spline = "160 585 253 587 342 586 "
PROPERTY label_y_offset = 22	
PROPERTY latency_font = 2	EDGE rss_fcs_grd_tgt_data
PROPERTY latency_x_offset = 0	EXTERNAL ->
PROPERTY latency_y_offset = 0	fcs_2_2665_2628
PROPERTY spline = "160 250 270 249 352 245 "	PROPERTY id = 2638
	PROPERTY label_font = 2
EDGE was_fcs_wpn_data	PROPERTY label_x_offset = - 132
EXTERNAL ->	PROPERTY label_y_offset = -8
fcs_1_2666_2629	PROPERTY latency_font = 2
PROPERTY id = 2634	PROPERTY latency x offset = 0
PROPERTY label_font = 2	н
PROPERTY label_x_offset = - 111	PROPERTY spline = "157 555 282 554 374 556 "
PRUPERTY label_y_offset = 24	
PROPERTY latency_font = 2	EDGE rss fcs platform data
PROPERTY latency_x_offset = 0	EXTERNAL ->
PROPERTY latency_y_offset = 0	fcs 2 2665 2628
PROPERTY spline = "159 283 258 283 355 276 "	PROPERTY 1d = 2639
	PROPERTY label font = 2
EDGE mss_fcs_msn_data	PROPERTY label x offset = - 136
EXTERNAL ->	
fcs 1 2666 2629	
PROPERTY id = 2635	OBODEDEN 144400 - 464444 -
DANDERTY 1shell fort a 2	1
DENDERTY lebel & office at 145	property latency_y_outset = 0
OIT - PARTIOTYTHANK INTOWN	" 120 076 287 070 751 mg = "10/ 070 787 018 3/0 070 "
PRUPERII LADOL_y_orrset = 2/	
PRUPERTY Latency_font = 2	EDGE nss_fcs_nav_data
PROPERTY latency_x_offset = 0	EXTERNAL ->
	fcs_2_2665_2628
PROPERTY spline = "159 326 267 326 364 309 "	PROPERTY id = 2640
	PROPERTY label_font = 2
EDGE uss_fcs_nav_data	PROPERTY label_x_offset = - 147
EXTERNAL ->	PROPERTY label_y_offset = - 16
fcs_1_2666_2629	PROPERTY latency_font = 2
PROPERTY id = 2636	PROPERTY latency_r_offset = 0
PROPERTY label_font = 2	PROPERTY latency_y_offset = 0
	PROPERTY spline = "154 488 309 489 386 506 "
PROPERTY label_y_offset = -16	
PROPERTY latency_font = 2	EDGE dss_fcs_rel_cmd
PROPERTY latency_x_offset = 0	EXTERNAL ->
PROPERTY latency_y_offset = 0	fcs_2_2665_2628
PROPERTY spline = "155 110 289 109 370 124 "	PROPERTY id = 2641
	PROPERTY label_font = 2
EDGE rss_fcs_air_tgt_data	PROPERTY label_r_offset = - 116
EXTERNAL ->	PROPERTY label_y_offset = 20
fcs_2_2665_2628	PROPERTY latency_font = 2
PROPERTY id = 2637	PROPERTY latency_x_offset = 0
PROPERTY label_font = 2	PROPERTY latency_y_offset = 0
$PROPERTY$ label x offset = ~ 94	DBADEDTV anline - 1154 600 066 600

PROPERTY label_r_offset = 246 PROPERTY label_x_offset = 4 PROPERTY label_y_offset = 4 PROPERTY latency_Lont = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY spline = "560 131 681 131 "	EDUE ICS_MSS_GMG fcs_1_2666_2629 -> EXTEND PROPERTY id = 2648 PROPERTY label_font = 2 PROPERTY label_x_offset = 230 PROPERTY label_y_offset = 18 PROPERTY label_y_offset = 18	PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY spline = "579 236 685 246 " EDGE fcs_dss_wpn_data fcs_1_2666_2629 -> EXTERNAL PROPERTY id = 2650 PROPERTY id = 2650	PROPERTY label_x_offset = 167 PROPERTY label_y_offset = 2 PROPERTY latency_foot = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY spline = "638 333 689 336 " EDGE fcs_uss_cmd fcs_2_2666_2628 -> EXTERNAL PROPERTY id = 2651	PRUPERIY label_roufs = 2 PRUPERIY label_x_offset = 210 PRUPERIY label_y_offset = 13 PRUPERIY latency_font = 2 PRUPERIY latency_roffset = 0 PRUPERIY latency_y_offset = 0 PRUPERIY spline = "613 579 693 579 " EDGE fcs_rss_cmd fcs_2_2666_2628 -> EXTERNAL PRUPERIY id = 2652 PRUPERIY id = 2652 PRUPERIY id = 2652 PRUPERIY id = 2652 PRUPERIY id = 107	PADPEATI LABOL_X_OXISSU = 19/ PADPEATY labol_y_offset = 2 PADPEATY latency_font = 2 PADPEATY latency_coffset = 0
EDGE wss_fcs_wpn_data EXTERNAL -> fcs_2_2666_2628 PROPERTY id = 2642 PROPERTY label_font = 2 PROPERTY label_x_offset = - 98 PROPERTY label_x_offset = 2 PROPERTY label_y_offset = 2	FRUPERIY Latency_ront = 2 PRUPERIY Latency_r_offset = 0 PRUPERIY latency_v_offset = 0 PRUPERIY spline = "152 667 265 666 339 660 " EDGE mss_fcs_msn_data EXTERNAL -> fcs_2_2665_2628	PROPERTY id = 2643 PROPERTY label_font = 2 PROPERTY label_x_offset = -127 PROPERTY label_y_offset = 29 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY spline = "148 709 281 708 391 688 "	EDGE fcs_wss_cmd fcs_1_2666_2629 -> EXTENSAL PROPERTY id = 2644 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY latency_roffset = 9 PROPERTY latency_roffset = 0 EDGE fcs_rss_cmd fcs_1_2666_2629 -> EXTERNAL PROPERTY id = 2645 PROPERTY label_font = 2 PROPERTY label_x_offset = 237 PROPERTY label_x_offset = 8 PROPERTY label_y_offset = 0 PROPERTY latency_tont = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 0 PROPERTY spline = "573 186 681 185 "	EDUE I CS_FSS_NAV_data fcs_1_2666_2629 -> EXTENNAL PROPERTY id = 2647	

fcs_1_2666_2629 PROPERTY id = 2660 PROPERTY label font = 2	PROPERTY label x_offset = - 119 PROPERTY label_y_offset = 4	PROPERTY latency_font = 2	PROPERTY latency_r_offset = 0	PROPERTY soline = "431 476 423 400 431 338 "		EDGE fcs2_fcs1_critical_data	fcs_2_2665_2628 ->	fcs_1_2666_2629	PROPERTY id = 2661 Denomination D	PROPERTY label x offset = - 161	11	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "396 479 381 397 403 327 "		Educa Lost, crat.	1 C2-1 2000 102 1 20 20 20 20 20 20 20 20 20 20 20 20 20	0507_6007_524	PROPERTY Jahe 1 font = 2	PROPERTY label_x_offset = 6		8	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 15	PROPERTY spline = "512 337 514 464 "		EDGE fcs1_fcs2_health	fcs_1_2666_2629 ->	fcs_2_2665_2628	PROPERTY id = 2663	PROPERTY label_x_offset = 5	PROPERTY label_y_offset = 22	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 15	PROPERTY spline = "544 338 552 405 542 473 "		EDGE fcs1_fcs2_critical_data	fcs_1_2666_2629 ->	fcs_2_2665_2628	PROPERTY id = 2664	PROPERTY label_font = 2	PROPERTY label_x_offset = - 11	PROPERTY label_y_offset = 54	
PROPERTY latency_v_offset = 0 PROPERTY spline = "630 554 697 549 "	EDGE fcs_rss_nav_data fcs_2_2665_2628 ->	EXTERNAL	PROPERTY id = 2656	PROPERTY label x offset = 204	PROPERTY label_y_offset = -6	PROPERTY Latency_font = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "615 503 700 497 "	EDGE fcs mss cmd	fcs_2_2665_2628 ->	EXTERNAL	PROPERTY id = 2656	PROPERTY label_font = 2	PROPERTY label_x_offset = 179	PRUPERIT LEDGILY OILSET = 15	property leteral category	DEDUCATION TO THE TOTAL TO THE	DRODDEN	010	EDGE fcs_dss_wpn_data	fcs 2 2665 2628 ->	EXTERNAL	PROPERTY id = 2658	PROPERTY label_font = 2	PRUPERTY label_x_offset = 197	PROPERTY label_y_offset = 17	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0		PROPERTY spline = "622 676 687 679 "	EDGE fcs_2_fcs1_cntrl	fcs_2_2665_2628 ->	fcs_1_2666_2629	PROPERTY id = 2659		PROPERTY label_r_offset = - 115	PROPERTY label_y_offset = -36	PROPERTY latency_font = 2	PROPERTY latency_x_offset = 0	PROPERTY latency_y_offset = 0	PROPERTY spline = "462 462 459 349 "		EDGE fcs2_fcs1_health	fcs_2_2665_2628 ->	

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PROPERTY latency_y_offset = 0
PROPERTY spline = "585 705 608 721 637 731 701 728 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 0
PROPERTY spline = "572 735 599 748 624 754 700 751 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY latency_v_offset = 15
PROPERTY spline = "577 265 634 290 683 295 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY latency_y_offset = 15
PROPERTY spline = "594 640 630 649 688 651 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          fcs2_fcs1_critical_data : fcs_critical_format,
  fcs2_fcs1_health : fcs_health_format,
  fcs_2_fcs1_cntr1 : fcs_cntr1_format
CONTROL CONSTRAINTS
                                                                                                                                PROPERTY label_x_offset = 213
                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY label_font = 2
PROPERTY label_x_offset = 223
PROPERTY label_y_offset = 12
PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY label_x_offset = 205
PROPERTY label_y_offset = 23
PROPERTY latency_font = 2
PROPERTY latency_r_offset = 0
                                                                                                                                                                                                         PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY label_x_offset = 205
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PROPERTY latency_x_offset = 0
                                                                                                                                                          PROPERTY label_y_offset = 17
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY label_y_offset = 14
                                                                                                                                                                               PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY latency_font = 2
                                                                                                        PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_font = 2
                                                                              PROPERTY id = 2840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY id = 2792
                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY id = 2841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY id = 2793
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EDGE fcs_wss_rel_cmd
fcs_1_2666_2629 ->
EXTERNAL
                       fcs_2_2665_2628 ->
                                                                                                                                                                                                                                                                                                                                         fcs_2_2665_2628 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EDGE fcs_wss_rel_cmd
fcs_2_2665_2628 ->
                                                                                                                                                                                                                                                                                                               EDGE fcs_nss_cmd
                                                                                                                                                                                                                                                                                                                                                                   EXTERNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EXTERNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DATA STREAM
                       PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY spline = "575 348 589 409 562 475 "
                                                                                                                                                                                                                                                                                                                                                               PROPERTY latency_y_offset = 0
PROPERTY spline = "581 338 619 362 692 366 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PACPERTY latency_x_offset = 0
PACPERTY latency_y_offset = 0
PROPERTY spline = "591 688 638 707 696 705 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY latency_y_offset = 0
PROPERTY spline = "518 128 589 101 684 99
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY latency_y_offset = 0
PROPERTY spline = "498 113 557 72 692 69
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY label_y_offset = -17
PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY label_y_offset = - 7
                                                                                                                                                                                                                                                         PROPERTY label_x_offset = 211
                                                                                                                                                                                                                                                                                                                                       PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY label_x_offset = 253
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY label_x_offset = 284
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY label_x_offset = 208
                                                                                                                                                                                                                                                                                     PROPERTY label_y_offset = 23
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY label_y_offset = 19
PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                               PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY latency_font = 2
                                                                                                                                                                                                                                 PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PRUPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY label_font = 2
                                                                                                                                                                                                         PROPERTY id = 2836
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY id = 2837
                                                                                                                                EDGE fcs_dss_tgt_data
fcs_1_2666_2629 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PROPERTY id = 2838
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   EDGE fcs_dss_tgt_data
fcs_2_2665_2628 ->
EXTERNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PROPERTY id = 2839
                                                                                                                                                                                                                                                                                                                                                                                                                                        EDGE fcs_nss_cmd
fcs_1_2666_2629 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   EDGE fcs_dss_cmd
fcs_1_2666_2629 ->
EXTERNAL
                                                                                                                                                                                    EXTERNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EXTERNAL
```

	PROPERTY label_font = 3
UPERATOR fcs_2_2665_2628	
	PRUPEKII LADOL_Y_OIISOT = 104 DRODRRY == + 4-x+ = - 2
OPERATOR fcs_1_2666_2629	PROPERTY met_x_offset = 121
	PROPERTY met_y_offset = -5
END	PROPERTY is_terminator = FALSE
OPERATOR mass_storage_subsystem_2581	VERTET mes men data account 2802 0700 . 100 MICHORD
SPECIFICATION	DRUBERTY + 1 305
INPUT	PROPERTY v = 191
fcs_mss_cnd : fcs_status_format	
TUTTO	PROPERTY color = 62
mss_wss_stores_data : stores_format	PROPERTY label_font = 3
	PROPERTY label_x_offset = 28
HSS_fcs_HSB_data : HSB_format	PROPERTY label_y_offset = 103
	PROPERTY met_font = 2
	_
MAAIRUM EAECUIIUN TIME 1 MS	PROPERTY met_y_offset = - 5
	PROPERTY is terminator = FALSE
URBITON men mede demonstrate of the standard	EDGE mss_send_wpn_data
DECEMBER - 154	mss_mode_control_2690_2680 ->
PROPERTY = 101	mss_wpn_data_processing_2691_2681
PROPERTY 9 = 38	PROPERTY id = 2685
PROPERTY radius = 71	PROPERTY label_font = 2
PROPERTY color = 28	PROPERTY label_x_offset = 56
PROPERTY label_font = 3	PROPERTY label_y_offset = 51
label_x_offset	PROPERTY latency_font = 3
PROPERTY label_y_offset = 92	PROPERTY latency_x_offset = 0
PROPERTY met_font = 2	PROPERTY latency v offset = 0
PROPERTY met_x_offset = 125	PROPERTY spline = "247 273 325 396 "
PROPERTY met_y_offset = -5	
PROPERTY is_terminator = FALSE	EDGE mss send stores data
	Bss Bode control 2690 2680 ->
VERTEX mss_wpn_data_processing_2691_2681 : 100 MICROSEC	mss_stores_data_processing_2692_2682
PROPERTY $x = 394$	PROPERTY id = 2686
PROPERTY y = 404	PROPERTY label font = 2
PROPERTY radius = 71	PROPERTY label_x_offset = - 49
PROPERTY color = 62	PROPERTY label_y_offset = 139
PROPERTY label_font = 3	PROPERTY latency_font = 3
	PROPERTY latency_x_offset = 0
PROPERTY label_y_offset = 103	PROPERTY latency_y_offset = 0
	PROPERTY spline = "223 289 270 451 364 571 "
PROPERTY met_x_offset = 125	
PROPERTY met_y_offset = - 5	EDGE mss_wss_wpn_data
PROPERTY is_terminator = FALSE	mss_wpn_data_processing_2691_2681 ->
	EXTERNAL
VERIER mss_stores_data_processing_2692_2682 : 100 MICROSEC	PROPERTY id = 2688
PROPERTY X = 396	PROPERTY label_font = 2
PRUPERTY 9 = 585	II
	PROPERTY label_y_offset = -10
PRIDERTY COLOT = 63	DECORPTY Johnson Combined

mss_stores_data_processing_2692_2682 -> PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "545 471 818 471 " PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "303 206 364 259 " PROPERTY latency_y_offset = 0 PROPERTY spline = "556 259 830 260 " PROPERTY latency_x_offset = 0 PROPERTY latency_y_offset = 0 PROPERTY spline = "54 183 126 182 " PROPERTY latency_y_offset = 0 PROPERTY spline = "556 652 814 652 mss_msn_data_processing_2802_2799 -> mss_mode_control_2690_2680 -> mss_msn_data_processing_2802_2799 PROPERTY id = 2800 PROPERTY label font = 2
PROPERTY label_x_offset = -45
PROPERTY label_y_offset = -56
PROPERTY latency_font = 2 PROPERTY label_y_offset = - 11 PROPERTY label_x_offset = 112
PROPERTY label_y_offset = - 11
PROPERTY latency_font = 2
PROPERTY latency_x_offset = 0 PROPERTY label_x_offset = -92 PROPERTY label_y_offset = -16 PROPERTY latency_x_offset = 0 PROPERTY label_x_offset = 78 PROPERTY latency_font = 3 PROPERTY latency_font = 2 mss_mode_control_2690_2680 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 EDGE mss_wss_stores_data EDGE mss_send_msn_data PROPERTY id = 2689 PROPERTY id = 2835 PROPERTY id = 2801 EDGE mss_fcs_msn_data EDGE fcs_mss_cmd EXTERNAL ->

OPERATOR mss_stores_data_processing_2692_2682 MINIMUM CALLING PERIOD 20 MS OPERATOR mss_msn_data_processing_2802_2799 OPERATOR mss_wpn_data_processing_2691_2681 IMPLEMENTATION ADA mss_msn_data_processing_2802 OPERATOR mss_mode_control_2690_2680 MINIMUM CALLING PERIOD 20 MS mss_wss_stores_data : stores_format MAXIMUM EXECUTION TIME 100 MICROSEC IMPLEMENTATION ADA mss_mode_control_2690 OPERATOR mss_stores_data_processing_2692 MAXIMUM EXECUTION TIME 100 MICROSEC mss_send_msn_data : BODLEAN MAXIMUM EXECUTION TIME 50 MICROSEC cs_mss_cmd : fcs_status_format OPERATOR mss_msn_data_processing_2802 MINIMUM CALLING PERIOD 20 MS MINIMUM CALLING PERIOD 20 MS mss_send_stores_data : BOOLEAN mss_send_stores_data : BOOLEAN mss_fcs_msn_data : msn_format mss_send_stores_data : BOOLEAN, mss_send_wpn_data : BOOLEAN mss_send_wpn_data : BOOLEAN mss_send_msn_data : BOOLEAN mss_send_msn_data : BOOLEAN, OPERATOR mss_mode_control_2690 SPECIFICATION CONTROL CONSTRAINTS SPECIFICATION SPECIFICATION DUTPUT DUTPUT DUTPUT DUTPUT OUTPUT INPUT INPUT

DATA STREAM

EXTERNAL

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/ERTEX rss_platform_processing_2608_2586 : 50 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             VERTEX rss_mode_control_2607_2585 : 50 MICROSEC
                                                                                                                                                                                                                                                                                                                                                  rss_fcs_grd_tgt_data : delta_tgt_format
                                                                                                                                                                                                                                                                                                                                                                                                     rss_fcs_air_tgt_data : delta_tgt_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                        rss_fcs_platform_data : nav_format
                                                                                                                                                                                                                                         fcs_rss_cmd : fcs_status_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY is_terminator = FALSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY is_terminator = FALSE
                                                                                                                                   sim_grd_tgt_data : nav_format
                                                                                                                                                                                      sim_air_tgt_data : nav_format
                                                                                                                                                                                                                                                                                               fcs_rss_nav_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY label_x_offset = 31
PROPERTY label_y_offset = 84
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY met_y_offset = - 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY label_x_offset = 18
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY label_y_offset = 86
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY met_x_offset = 107
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY met_font = 2
PROPERTY met_x_offset = 96
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              rss_mode_phase : Rate_25Hz
                                                                                ownship_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_font = 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY met_y_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       MAXIMUM EXECUTION TIME 3 MS
OPERATOR radar_sub_system_2577
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_font = 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY met_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY radius = 64
PROPERTY color = 28
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           radius = 62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY color = 63
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY x = 156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY x = 679
PROPERTY y = 582
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY y = 54
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IMPLEMENTATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY
                        SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                          DUTPUT
                                                                                                                                                                                                                                                                                                                       DUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                DUTPUT
                                                                                                      INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GRAPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 again for that weapon. If hung, weapons behind the hung weapon can
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (This interface is responsible for releasing the weapon id provided in wpn_release_signal. There are no provisions for detecting the multiple release of a weapon. An exception is generated, on a random basis, to report a hung weapon. It is possible to attempt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      another release of the hung weapon by sending the release command
                   IMPLEMENTATION ADA mss_stores_data_processing_2692
                                                                                                                                                                                                                                                                                                                                        IMPLEMENTATION ADA mss_wpn_data_processing_2691
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IMPLEMENTATION Adm rack_interface_unit_2767
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       wpn_release_signal : wpn_id_format
                                                                                                                                                                                                                                                                                       MAXIMUM EXECUTION TIME 100 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     hung_weapon : exception_type
MAXIMUM EXECUTION TIME 100 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IMPLEMENTATION ADA nav_sub_system_2578
                                                                                                                         OPERATOR mss_wpn_data_processing_2691
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    fcs_nss_cmd : fcs_status_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     random_process, hung_exception
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       nss_fcs_nav_data : nav_format
                                                                                                                                                                                                            mss_send_wpn_data : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OPERATOR rack_interface_unit_2767
SPECIFICATION
                                                                                                                                                                                                                                                                    mss_wss_wpn_data : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ownship_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                   OPERATOR nav_sub_system_2578
SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            not be released. }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DESCRIPTION
                                                                                                                                                      SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KEYWORDS
                                                                                                                                                                                                                                    OUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               OUTPUT
                                                                                                                                                                                    INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               END
```

VERTEX rss_air_air_mode_2609_2587 : 200 MICROSEC

PROPERTY id = 2591 PROPERTY label_font = 2 PROPERTY label_x_offset = - 59 PROPERTY label_y_offset = - 6 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 10 PROPERTY latency_y_offset = 15 PROPERTY spline = "314 49 342 25 431 25 "	EDGE rss_fcs_grd_tgt_data rss_air_grd_mode_2610_2588 -> EXTENNAL PROPERTY id = 2592 PROPERTY label_font = 2 PROPERTY label_font = - 56 PROPERTY label_x_offset = - 56	7 -> 24 # # # # # # # # # # # # # # # # # #	PROPERTY label_font = 2 PROPERTY label_x_offset = 3 PROPERTY label_y_offset = -27 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 15 PROPERTY latency_x_offset = 15 PROPERTY spline = "816 463 890 461 " EDGE rss_fcs_platform_data rss_platform_processing_2608_2586 -> EXTERNAL PROPERTY id = 2595 PROPERTY label_font = 2	PROPERTY label_x_offset = 5 PROPERTY label_y_offset = -24 PROPERTY latency_font = -2 PROPERTY latency_font = 0 PROPERTY latency_x_offset = 15 PROPERTY latency_y_offset = 15 PROPERTY spline = "813 637 873 636 " EDGE rss_mode_control_2607_2585 -> rss_mode_control_2607_2585 -> rss_mode_control_2607_2585 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_x_offset = -40 PROPERTY label_y_offset = 35 PROPERTY label_y_offset = 35
x = 674 y = 406 radius = 65 color = 62 label_font = 3 label_y_offset = label_y_offset = met_font = 2 met_font = 2	PROPERTY met_y_offset = - 5 PROPERTY is_terminator = FALSE VERTEX rss_air_grd_mode_2610_2688 : 200 MIGROSEC PROPERTY x = 665 PROPERTY y = 210 PROPERTY radius = 66		VERTEX rss_nav_processing_2611_2589 : 50 MICRUSEC PROPERTY x = 447 PROPERTY y = 49 PROPERTY y add = 49 PROPERTY color = 63 PROPERTY label_font = 3 PROPERTY label_font = 22 PROPERTY label_t_offset = 89 PROPERTY label_t_offset = 89 PROPERTY label_t_offset = 117 PROPERTY met_font = 2 PROPERTY met_font = 2 PROPERTY met_font = 2 PROPERTY met_font = 117 PROPERTY met_y_offset = 117	EDGE fcs_rss_cmd EXTERNAL ->

PROPERTY label_x_offset = -68
PROPERTY label_y_offset = 8
PROPERTY latency_tont = 2
PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY stency_y_offset = 15
PROPERTY spline = "290 335 444 461 646 468 " PROPERTY latency_y_offset = 15 PROPERTY spline = "260 386 413 562 559 639 " PROPERTY label_x_offset = -30
PROPERTY label_y_offset = 26
PROPERTY latency_font = 2
PROPERTY latency_x_offset = 0
PROPERTY latency_x_offset = 15
PROPERTY stency_y_offset = 15
PROPERTY spline = "439 711 524 674 619 665 " PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 0
PROPERTY spline = "454 520 496 495 617 498 " EDGE rss_erec_phase_all
rss_mode_control_2607_2585 ->
rss_platform_processing_2608_2586 PROPERTY label_x_offset = - 144 rss_platform_processing_2608_2586 PROPERTY label_y_offset = -3 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY label_y_offset = 24 rss_mode_control_2607_2585 -> PROPERTY id = 2606
PROPERTY label_font = 2
PROPERTY label_x_offset = PROPERTY label_x_offset = PROPERTY latency_font = 2 rss_air_mir_mode_2609_2587 rss_air_grd_mode_2610_2588 rss_air_air_mode_2609_2587 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY id = 2603 PROPERTY id = 2605 PROPERTY id = 2602 PROPERTY id = 2604 EDGE sim_grd_tgt_data EDGE sim_air_tgt_data EDGE ownship_data EXTERNAL -> EXTERNAL -> EXTERNAL -> PRUPERTY latency_font = 2
PRUPERTY latency_x_offset = 0
PRUPERTY latency_y_offset = 15
PRUPERTY spline = "287 242 414 299 600 299 " PROPERTY latency_v_offset = 15 PROPERTY spline = "322 99 348 120 326 144 " PROPERTY label_roft = 2
PROPERTY label_r_offset = -13
PROPERTY label_y_offset = -29
PROPERTY latency_font = 2
PROPERTY latency_roftset = 0
PROPERTY latency_r_offset = 16
PROPERTY latency_r_offset = 16 PROPERTY latency x offset = 0 PROPERTY latency y offset = 15 PROPERTY spline = "528 256 601 394" PROPERTY latency_font = 2
PROPERTY latency_k_offset = 0
PROPERTY latency_k_offset = 15
PROPERTY spline = "309 226 447 226 " PROPERTY label font = 2 PROPERTY label_x_offset = -33 PROPERTY label_y_offset = 17 PROPERTY label_x_offset = - 72 PROPERTY latency_x_offset = 0 rss_nav_processing_2611_2589 -> rss_air_grd_mode_2610_2588 PROPERTY id = 2598 rss_nav_processing_2611_2589 -> rss_air_air_mode_2609_2587 PROPERTY label_x_offset = 50 PROPERTY label_y_offset = 54 PROPERTY label_y_offset = 15 EDGE rss_exec_phase_all rss_mode_control_2607_2585 -> rss_nav_processing_2611_2589 PROPERTY id = 2600 EDGE rss_exec_phase_1
rss_mode_control_2607_2585 -> PROPERTY latency_font = 2 rss_air_grd_mode_2610_2588 PROPERTY label_font = 2 PROPERTY label_font = 2 PROPERTY id = 2599 PROPERTY id = 2601 EDGE rss_nav_data EDGE rss_nav_data

EDGE rss_exec_phase_2

PROPERTY label_y_offset = 63	INPUT
PROPERTY latency_font = 2	rss_nav_data : nav_format
PROPERTY latency_x_offset = 0	INPUT
PROPERTY latency_y_offset = 0	rss_exec_phase_2 : BGOLEAN
PROPERTY spline = "476 346 524 317 620 315 "	INPUT
To be desired to the second se	sim_air_tgt_data : nav_tormat
DAIA SIRGAR	t attent . The test that Attent
Fus exec prase Z : Duulean	CATED : GOOD SO TID SOT SOT SOT
rss_exec_phase_1 : BUULEAN,	
rss_exec_phase_all : BOOLEAN,	CND
rss_nav_data : nav_format	IMPLEMENTATION ADA rss_air_mode_
CONTROL CONSTRAINTS	
	END
CORPETOR res mode control 2607 2585	
THE PRINCIPLE OF THE PR	Charles and the same of the Control
INTEGERED DI ALL	OFFIRE TESTALL BIG MODE COLO
TCS_rss_chd	SPECIFICATION
MINIMUM CALLING PERIOD 20 MS	INPUT
MAXIMUM RESPONSE TIME 5 MS	rss_nav_data : nav_format
OUTPUT	INPUT
rss_exec_phase_1	rss_exec_phase_1 : BOULEAN
IF rss_mode_phase = 0	INPUT
	sim_grd_tgt_data : nav_format
OUTPUT	DUTPUT
rss_exec_phase_2	rss_fcs_grd_tgt_data : delta_t
IF rss mode phase = 1	MAXIMUM EXECUTION TIME 200 MICRO
	KEYWORDS
OUTPUT	type_processing
rss_exec_phase_all	DESCRIPTION
IF TRUE	{Calculate delta x, y, z for t
	Calculate range based on delt
OPERATOR rss platform processing 2608 2586	AXIONS
TRIGGERED BY ALL	$\{delta x = tgt x - ovn x$
	delta v = tet v - own v
UN OC CUIEDO UNILITA MUNICIPA	delta a m tat a mount
	range s sort(delta x*delta x
787C DOAC als sis sis as ATT 870C	The state of the s
TRIGGRAD RY ALL	IMPLEMENTATION ADA rss air ord mode
MINIMUM CALLING PERIOD 20 MS	· END
CORP. CLOC. Land Comp. Comp. Comp. Comp.	TOSC Company of the new down dance
Urenalun Iss_alr_gro_mode_2010_2000 TRIGGERED RV All	SPECIFICATION
	TUGNI
MINIMUM CALLING PERIOD 20 MS	for ras cad : fcs status forms
	LIMANI
OPERATOR rss_nav_processing_2611_2589	rss_mode_phase : Rate_25Hz
TRIGGERED BY ALL	OUTPUT
rss_exec_phase_all	rss_mode_phase : Rate_25Hz
MINIMUM CALLING PERIOD 20 MS	TOGINO
END	rss_exec_phase_all : BOOLEAN
OCAC About the state and activated	NEG PRO 1 - BOOKER 1 - BOOKER
UPERALUM ISSILATE ALF MODELACOUS SPECIFICATION	UTPUT
of four ton tion	• • • • • • • • • • • • • • • • • • • •

rss_fcs_air_tgt_data : delta_tgt_format MAXIMUM EXECUTION TIME 200 MICROSEC

EMENTATION ADA rss_air_air_mode_2609

```
VERTEX rack_interface_unit_2767_2766 : 100 MICROSEC
                                                                                                                                    mss_wss_stores_data : stores_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          wpn_release_signal : wpn_id_format
INITIALLY
                                                                                       fcs_wss_cmd : fcs_status_format INPUT
                                                                                                                                                                                                                                                                                                                           Wss_fcs_wpn_data : wpn_format
                                                                                                                                                                                av_consent_switch : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                wss_init_required : BOOLEAN
                                                                                                                                                                                                                                                                         mss_wss_wpn_data : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       wss_init_request : BOOLEAN
                        OPERATOR Weapon_sub_system_2579
SPECIFICATION
                                                                                                                                                                                                                             fcs_wss_rel_cmd : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 MAXIMUM EXECUTION TIME 5 MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY radius = 65
PROPERTY color = 62
PROPERTY label_font = 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       release_count : INTEGER
                                                                                                                                                                                                                                                                                                                                                                                                                                                       wpn_id : wpn_id_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              next_wpn_req : BOOLEAN INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       no_weapon_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            no_weapon_selected
                                                                                                                                                                                                                                                                                                                                                                  wpn_count : INTEGER
INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY x = 702
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY y = 598
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                INITIALLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     INITIALLY
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IMPLEMENTATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              FALSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FALSE
                                                                                                                                                                                                                                                                                                                                               STATES
                                                                                                                                                                                                                                                                                                                                                                                                                                    STATES
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STATES
                                                                                                                                                                                                                                                                                                    OUTPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 STATES
                                                                                                                                                           INPUT
                                                                                                                                                                                                                                                    INPUT
                                                                                                                                                                                                       INPUT
                                                                                                                                                                                                                         {rss_exec_phase_all AND (rss_exec_phase_1 OR rss_exec_phase_2) = true rss_exec_phase_1 XOR rss_exec_phase_2 = true }
                                                                                                           (This operator is responsible for scheduling all radar processes. Processes are scheduled at either 50Hz or 25Hz. For those processes that are scheduled at 25Hz, they can be executed in either Phase 1 or Phase 2. }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IMPLEMENTATION ADA rss_platform_processing_2608
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IMPLEMENTATION ADA rss_nav_processing_2611
                                                                                                                                                                                                                                                                                         IMPLEMENTATION ADA rss_mode_control_2607
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          rss_fcs_platform_data : nav_format MAXINUM EXECUTION TIME 50 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Removed error bias from design. }
                                                                  Periodic, Scheduling, Rate, Phase
rss_exec_phase_2 : BOOLEAN
MAXIMUM EXECUTION TIME 50 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              rss_nav_data : nav_format
MAXIMUM EXECUTION TIME 50 MICROSEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                {Pass-thru of fcs_rss_nav_data }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OPERATOR rss_platform_processing_2608
SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                         fcs_rss_nav_data : nav_format
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  rss_exec_phase_all : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             rss_exec_phase_all : BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (Pass thru of ownship_data.
                                                                                                                                                                                                                                                                                                                                                                                     OPERATOR rss_nav_processing_2611
SPECIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ownship_data : nav_format
                                                                                       DESCRIPTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  pass_thru
DESCRIPTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pass_thru
DESCRIPTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        INPUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      岛
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PROPERTY label_y_offset = 83 PROPERTY met_font = 2 PROPERTY met_x_offset = 124 PROPERTY met_y_offset = - 5 PROPERTY is_terminator = FALSE	VERIEX wss_release_processing_2756_2752 : 200 MICROSEC PROPERTY x = 689 PROPERTY y = 374 PROPERTY radius = 63 PROPERTY label_font = 3 PROPERTY label_font = 3 PROPERTY label_y_offset = 22 PROPERTY label_y_offset = 83 PROPERTY met_font = 2 PROPERTY met_y_offset = 134 PROPERTY met_y_offset = 134 PROPERTY met_y_offset = 33 PROPERTY is_terminator = FALSE	EDGE fcs_wss_cmd EXTERNAL -> wss_mode_control_2754_2750 PROPERTY id= 2768 PROPERTY label_font = 2 PROPERTY label_x_offeet = -47 PROPERTY label_y_offset = -6 PROPERTY latency_coffset = 0 PROPERTY latency_coffset = 15 PROPERTY latency_coffset = 16 PROPERTY latency_coffset = 15 PROPERTY spline = "24 108 68 85 " EDGE wss_init_required wss_inventory_management_2755_2751	PROPERTY id = 2769 PROPERTY label_font = 2 PROPERTY label_x_offset = -31 PROPERTY label_y_offset = -13 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0 PROPERTY latency_x_offset = 15 PROPERTY spline = "333 134" EDGE wss_init_request wss_inventory_management_2755_2751 -> wss_mode_control_2754_2750 PROPERTY id = 2770 PROPERTY label_font = 2 PROPERTY label_x_offset = -50 PROPERTY label_x_offset = 25 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_font = 2 PROPERTY latency_x_offset = 0
PROPERTY label_x_offset = 26 PROPERTY label_y_offset = 89 PROPERTY met_font = 2 PROPERTY met_font = 134 PROPERTY met_y_offset = 134 PROPERTY is confinator = PAISE	VERTEX was initiate release squence 2753_2749 : 200 MICROSEC PROPERTY x = 359 PROPERTY y = 372 PROPERTY radius = 64 PROPERTY radius = 64 PROPERTY label_font = 3 PROPERTY label_x_offset = 29 PROPERTY label_x_offset = 95 PROPERTY met_font = 112 PROPERTY met_font = 112 PROPERTY met_font = 112 PROPERTY met_font = 9	PROPERTY is_terminator = FALSE VERIEX wss_mode_control_2764_2750 : 50 MICROSEC PROPERTY x = 133 PROPERTY radius = 63 PROPERTY label_fout = 3 PROPERTY label_fout = 3 PROPERTY label_fout = 3 PROPERTY label_fout = 3 PROPERTY label_x_offset = 85 PROPERTY met_x_offset = 109 PROPERTY met_x_offset = 109 PROPERTY met_y_offset = - 5 PROPERTY x = 369 PROPERTY y = 164 PROPERTY radius = 64 PROPERTY color = 3 PROPERTY label_font = 3 PROPERTY label_font = 22 PROPERTY label_x_offset = 22 PROPERTY met_x_offset = 107 PROPERTY met_x_offset = - 5 PROPERTY met_x_offset = - 6 PROPERTY met_x_offset = - 6 PROPERTY = 367 PROPERTY x = 367 PROPERTY x = 367 PROPERTY radius = 62 PROPERTY label_font = 3 PROPERTY label_font = 3 PROPERTY label_font = 3	

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wss_initiate_release_squence_2753_2749 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        wss_release_processing_2756_2752 ->
wss_initiate_release_squence_2753_2749
PROPERTY id = 2777
                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY latency_y_offset = 15
PROPERTY spline = "543 403 636 403 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY spline = "661 484 536 478 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           wss_inventory_management_2755_2751 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY latency_x_offset = 0
PROPERTY latency_z_offset = 15
PROPERTY spline = "657 388 572 361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  wss_release_processing_2756_2752 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY label_x_offset = - 176
PROPERTY label_y_offset = - 42
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY label_font = 2
PROPERTY label_x_offset = -36
PROPERTY label_y_offset = 23
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            wss_inventory_management_2755_2751
                                                                                                                                                                                                                                                                                                                                            PROPERTY label_x_offset = - 37
                                                                                              PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY spline = "810 561"
                                                   PROPERTY label_y_offset = -8
                                                                                                                                                                                                                                                                   wss_release_processing_2756_2752
                                                                                                                                                                                                                                                                                                                                                                                                                        PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   wss_release_processing_2756_2752
PROPERTY id = 2779
                                                                                                                                                                                                                                                                                                                                                                       PROPERTY label_y_offset = 24
PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PROPERTY label_x_offset = 0
PROPERTY label_y_offset = 0
                        PROPERTY label_x_offset =
                                                                      PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PRUPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                      PROPERTY label_font = 2
PRUPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                            PROPERTY id = 2776
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY id = 2778
                                                                                                                                                                                                         EDGE release_count
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EDGE next_wpn_req
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   EDGE hung_weapon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EDGE wpn_id
```

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wss_init_required, wss_exec_phase, next_wpn_req, hung_weapon MININUM CALLING PERIOD 20 MS
                                                                                                                                                   PROPERTY latency_font = 2
PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY spline = "22 580 395 585 515 559 625 536
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OPERATOR wss_initiate_release_squence_2753_2749
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OPERATOR wss_inventory_management_2755_2751
TRIGGERED BY SOME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OPERATOR rack_interface_unit_2767_2768
TRIGGERED BY ALL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OPERATOR wss_not_implemented_2789_2788
TRIGGERED IF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY latency_y_offset = 15
PROPERTY spline = "39 675 260 675 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OPERATOR wss_mode_control_2754_2750
TRIGGERED BY ALL
                                                                                                                                                                                                                                                                                                                                                                                                 PROPERTY label_font = 2
PROPERTY label_x_offset = -233
                          wss_releass_processing_2756_2752
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               wss_exec_phase, hung_weapon
MINIMUM CALLING PERIOD 20 MS
                                                                                                                             PROPERTY label_y_offset = 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 MINIMUM CALLING PERIOD 20 MS
                                                                                                                                                                                                                                                                                                                                             wss_not_implemented_2789_2788
                                                                                                       PROPERTY label_x_offset =
                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY label_y_offset =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          wpn_release_signal
MINIMUM CALLING PERIOD 20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               hung_weapon : exception_type,
                                                                              PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EXCEPTION hung_weapon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   wss_exec_phase : BOOLEAN
                                                   PROPERTY id = 2784
                                                                                                                                                                                                                                                                                                                                                                        PROPERTY id = 2790
                                                                                                                                                                                                                                                                                          EDGE mss_wss_wpn_data
EXTERNAL ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TRIGGERED BY SOME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CONTROL CONSTRAINTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           fcs_wss_and
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    DATA STREAM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY label_font = 2
PROPERTY label_x_offset = 0
PROPERTY label_y_offset = 0
PROPERTY latency_font = 2
PROPERTY latency_x_offset = 0
PROPERTY latency_x_offset = 15
PROPERTY stency_y_offset = 15
                                                                                                                                                                                                                                                                                                             PROPERTY latency_x_offset = 0
PROPERTY latency_y_offset = 15
PROPERTY spline = "718 345 653 280 553 246 "
                      PROPERTY latency_y_offset = 15
PROPERTY spline = "515 265 611 313 684 370 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY latency_y_offset = 15
PROPERTY spline = "512 176 567 161 860 166 "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY latency_y_offset = 15
PROPERTY spline = "211 222 226 275 293 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          wss_inventory_management_2755_2751 -> EXTERNAL
                                                                                                                             wss_release_processing_2756_2752 ->
                                                                                                                                                PROPERTY id = 2780
PROPERTY id = 2780
PROPERTY label_font = 2
PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    wss_release_processing_2756_2752 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               wss_inventory_management_2755_2751
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_y_offset = - 21
PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               wss_release_processing_2756_2752
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PROPERTY latency_x_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PROPERTY label_x_offset = 226
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PROPERTY label_x_offset = 10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PROPERTY label_y_offset = 36
                                                                                                                                                                                                                                                            PROPERTY label_y_offset = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                    wss_mode_control_2754_2750 ->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                     PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PROPERTY latency_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PROPERTY label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           label_font = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY id = 2781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PROPERTY id = 2782
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PROPERTY id = 2783
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EDGE wss_fcs_wpn_data
                                                                                                                                                                                                                                                                                                                                                                                                                            EDGE wss_exec_phase
                                                                                                    EDGE hung_weapon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           EDGE wpn_count
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PROPERTY
```

EDGE av_consent_switch

OPERATOR wss_release_processing_2756_2752	wss_init_request : BOOLEAN
	OUTPUT
release_count, hung_weapon	wss_init_required : BOOLEAN
	wss.easc.phase : BOOLEAN
	MAXIMUM EXECUTION
UFERATUR WSS_initiate_release_squence_2753 SPECIFICATION	END TMPLEMENTATION And uses mode control 2754
INPUT	
wss_exec_phase : BUOLEAN	END
ICS_WSS_rel_cmq : buollan INPUT	UPERATUR wss_not_implemented_2789 SPECIFICATION
hung_weapon : exception_type	INDIA
That	mss_wss_wpn_data : BOOLEAN
Felease_count : INIEGER MAXIMUM EXECUTION TIME 200 MICROSEC	KEYWORDS not implemented
END	DESCRIPTION
IMPLEMENTATION ADA wss_initiate_release_squence_2753	This portion of the avionics model is not implemented.
	an operator is needed to receive the input stream. }
	IMPLEMENTATION Ada wss.not implemented 2789
DPERATOR wss_inventory_management_2755	
SPECIFICATION	END
wss_init_required : BOOLEAN	OPERATOR wss_release_processing_2756
TUKOT	SPECIFICATION
THE TARRET OF CARCA : SCORES TOTHER TARRET	LNPOI
next won red : BODIEAN	nung_weapon : exception_type
LINGINI	release count : INTEGER
hung_weapon : exception_type	INPUT
INPUT	wpn_id : wpn_id_format
wss_exec_phase : BUULEAN	INPUL
UDIFUL WSS_init_request : BOOLEAN	wpn_count : INTEGER INPUT
	av_consent_switch : BOOLEAN
wpn_id : wpn_id_format	TUTTO
	wpn_release_signal : wpn_id_format
WSS_ICS_Wpn_data : wpn_lormat	OUTPUT
MAKIMUM EXECUTION TIME 200 MICKUSEC	hung_weapon : exception_type Offrpur
MPLEMENTATION ADA wss_inventory_management_2755	next_wpn_req : BOOLEAN
. QX	WDD. count : INTEGER
	MAXIMUM EXECUTION TIME 200 MICROSEC
PERATOR wss_mode_control_2754 PECIFICATION	END IMPLEMENTATION ADA was release processing 2756
INPUT	
fcs_wss_cmd : fcs_status_format	END

APPENDIX C. PSDL UNIQUE SUFFIX NAMING CONVENTION MEMO

From berzins@cs.nps.navy.mil Thu Jul 25 15:40:50 1996

Return-Path: <berzins@cs.nps.navy.mil>

Received: from suns6.cs.nps.navy.mil by cs.nps.navy.mil (4.1/SMI-4.1)

id AA10627; Thu, 25 Jul 96 15:40:50 PDT

From: berzins@cs.nps.navy.mil (valdis Berzins)

Received: by suns6.cs.nps.navy.mil (4.1) id AA08716; Thu,

25 Jul 96 15:40:43 PDT

Date: Thu, 25 Jul 96 15:40:43 PDT

Message-Id: <9607252240.AA08716@suns6.cs.nps.navy.mil>

To: berzins@cs.nps.navy.mil, irwin@cs.nps.navy.mil,

kbmoelle@cs.nps.navy.mil,

luqi@cs.nps.navy.mil, mantak@cs.nps.navy.mil,

senrique@cs.nps.navy.mil

Subject: explanation of the new unique suffix conventions

Status: RO

Unique integer suffixes in CAPS Release 2

Valdis Berzins, 7/25/96

To properly implement PSDL scope rules, which say that the names of the children of a composite bubble are local to that bubble, we need unique internal names for PSDL operators. To allow multiple instances of the same type operation, we also need unique internal names for graph nodes.

The implementation in CAPS Release 2 will be based on the following conventions:

1. The psdl editor will supply unique internal integer suffixes for the names of stand-alone PSDL operators.

These suffixes WILL NOT BE VISIBLE TO THE USER OF THE EDITOR, and will be supplied automatically in generated skeleton code for operators with IMPLEMENTATION ADA.

The purpose of these suffixes is to allow two different composite bubbles to have children of the same name without conflicts between the Ada module names.

- 2. Names of PSDL data types will not have automatically created integer suffixes, because they are not needed.
- 3. Names of operations of PSDL data types will not have automatically created integer suffixes. This implies the translator does not have to resolve overloaded operators.
- 4. The psdl editor will add a unique integer suffix to each operation name to get the name of the corresponding graph node. This enables multiple instances of an operation of a data type to consistently co-exist in the same graph.
- 5. In release 2 the integer suffixes will be unique throughout the entire prototype and will be obtained from a procedure local to the editors (because there will be no DDB in release 2). In future releases the suffixes will be unique across all prototypes developed at a given installation, and will be obtained from a unique id server in the DDB.

Some consequences of these conventions:

- A. The name of the ada operation can be recovered from the name of the graph node by removing a trailing numeric suffix of the form ("_" digit+). Note that the name of the graph node does not include the optional parameter binding part.
- B. For prototypes created under caps release 2, graph nodes corresponding to stand-alone operators will have two integer suffixes, but only the second one need be recognized by computations in translation. The schedulers are only concerned with graph node ids, and hence are not affected by this convention.
- C. Graph nodes corresponding to operations of a PSDL data type have a single suffix. This suffix enables multiple instances of a type operation to appear in a graph without danger of confusion.
- D. Attributes and control constraints are located by visual navigation through the graphic editor, to avoid confusing the correspondence between graph nodes and control constraints.

E. PSDL files created under release 1 may not have these suffixes. The concrete parsing rules of the sde should recognize such cases, and should add the needed suffixes if they are missing, to enable the sde to read old psdl files (CAPS release 1 format). **EXAMPLE** Displayed form of the psdl, with explanatory comments: OPERATOR o -- internal name o_13, graph node o_13_20 SPECIFICATION INPUT a: boolean OUTPUT b: integer **END** IMPLEMENTATION ADA END TYPE t -- internal name t OPERATOR o -- overloaded, internal name o, graph node t.o_21(b|) SPECIFICATION INPUT x: integer END OPERATOR o -- overloaded, internal name o, graph node t.o_22(|a) SPECIFICATION OUTPUT y: boolean END END IMPLEMENTATION ADA END OPERATOR top SPECIFICATION END **IMPLEMENTATION** GRAPH -- internal form of the graph, whose display is suppressed: VERTEX o_13_20 VERTEX t.o_21(b|) VERTEX t.o_22(|a)

EDGE a $t.o_22(|a) \rightarrow o_13_20$ EDGE b $o_13_20 \rightarrow t.o_21(b|)$

END

Displayed form of the graph:

1		-	a	1	1	b	1		- 1
1	t.o(a)	- 1	>	1	0		->	t.o(b)	- 1
		-		1	1		- 1		1

APPENDIX D. GRAPH EDITOR PROGRAM SOURCE CODE

The following is the complete source code listing of the graph editor portion of the PSDL Editor. The original graph editor source code was developed by Captain Robert Dixon, USMC [Ref. 13]. Additional work was performed by Mr. Douglas Lange and Mr. Dagohoy Anunciado as part of the NPS CS4520 (AY96Q4) class project. In several of the graph editor files, the authors of the graph editor have adapted code written by others. Such instances are credited within the source files.

For a starting point, ge_driver.C contains the main() routine for the graph editor. This routine is called by the syntax-directed editor to start the graph editor. After initialization and establishing communications with the syntax-directed editor, the routine edit_graph() is called, which can be found at the end of the file graph_editor.C.

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 ge_interface.h resources.h ge_utilities.h graph_object.h font_table.h \
 operator_object.h stream_object.h spline_object.h warning.h \ graph_object.o: graph_object.C graph_object.h ge_defs.h ge_interface.h \ graph_editor.o: graph_editor.C action_area.h build_option.h ge_defs.h \
 ge_interface.h resources.h gettopshell.h graph_editor.h windows.h \
 ge_utilities.h graph_object_list.h graph_object.h font_table.h \ The following dependencies can be generated using the -MM ge_driver.o: ge_driver.C inter_process_utilities.h ge_interface.h \
graph_editor.h windows.h ge_utilities.h get_unique_id.h
\$(CC) \$(C+FLAGS) -c ge_driver.C ge_utilities.o: ge_utilities.c ge_utilities.h ge_interface.h
\$(C) \$(CFLAGS) -c ge_utilities.c ge_utilities_debug.o: ge_utilities_debug.c ge_interface.h \
ge_interface_labels.h ge_utilities.h ge_utilities_debug.h get_unique_id.o: get_unique_id.c get_unique_id.h build_option.o: build_option.c build_option.h flag on the gcc and g++ compiler. gettopshell.o: gettopshell.c gettopshell.h
\$(CC) \$(C++FLAGS) -c gettopshell.c \$(C) \$(CFLAGS) -c ge_utilities_debug.c ge_utilities_debug.h report_errors.h
i(CC) \$(C+FLAGS) -c graph_editor.C \$(CC) \$(C++FLAGS) -c build_option.c \$(CC) \$(C++FLAGS) -c graph_object.C \$(CC) \$(C++FLAGS) -c action_area.C ge_utilities.h warning.h
\$(CC) \$(C++FLAGS) -c font_table.C \$(C) \$(CFLAGS) -c get_unique_id.c windows.h ge_utilities.h resources.h font_table.h \$(RM) \$(SDEOBJECTS) k(RM) ../edit_graph \$(RM) \$(GOBJECTS) · · /sde ### NOTE: \$(RM) SDEGBJECTS= sde.o sde_simulator.o inter_process_utilities.o ge_utilities.o\ GOBJECTS= graph_editor.o operator_object.o stream_object.o spline_object.o\ DEBUG = -g -DGE_DEBUG CFLAGS = \$(DEBUG) -D_NO_PROTO C++FLAGS = \$(DEBUG) \$(C++INC) \$(C++LIB) -DFUNCPROTO -DXTFUNCPROTO #LIBS = -IXm -IXt -IXext -IXii -lm -gcc /usr/local/lib/libg++.a #LIBS = -IC -IXm -IXt -IXoxt -IXii -lm stream_property_menu.o operator_property_menu.o windows.o\ #LIBS = -1Xm -1Xt -1Xext -1X11 -1m -y_close_id_server edit_graph: \$(GOBJECTS) \$(CC) \$(C+FLAGS) -0 ../edit_graph \$(GOBJECTS) \$(LIBS) graph_object_list.o font_table.o graph_object.o\ setcursor.o gettopshell.o postpopup.o build_option.o\ ge_driver.o inter_process_utilities.o report_errors.o timer_tool.o action_area.o warning.o ge_utilities.o/ #C++LIB = -I /usr/lang/SC3.0.1/include/CC_413_U1 \$(C) \$(CFLAGS) -o ../sde \$(SDEOBJECTS) \$(LIBS) -g++ -gcc LIBS = -1Xm -1Xt -1Xext -1X11 -1m #C++INC = -L /usr/lang/SC3.0.1/lib #LIBS = -1Xm -1Xt -1Xext -1X11 -1m \$(CC) \$(C++FLAGS) -c \$*.C *(C) *(CFLAGS) -c **.c ge_utilities_debug.o/ ge_utilities_debug.o all: sde edit_graph *CFLAGS = \$(DEBUG) sde: \$(SDEOBJECTS) ***** ################# ****** get_unique_id.o \ #DEBUG = -g ‡ 8 20 = 20#

SUFFIXES: .o .C .c .h

ge_utilities_debug.h get_unique_id.h
\$(CC) \$(CC+FLAGS) -c graph_object_list.C

inter_process_utilities.o: inter_process_utilities.c \
 inter_process_utilities.h ge_interface.h ge_utilities.h
\$(C) \$(CFLAGS) -c inter_process_utilities.c

operator_object.o: operator_object.C operator_object.h ge_defs.h \
ge_interface.h resources.h graph_object.h font_table.h ge_utilities.h
\$(CC) \$(C+FLAGS) -c operator_object.C

operator_property_menu.o: operator_property_menu.C ge_defs.h ge_interface.h \
 resources.h ge_utilities.h gettopshell.h graph_editor.h windows.h \
 graph_object_list.h graph_object.h font_table.h \
 operator_object.h operator_property_menu.h warning.h action_area.h \
 build_option.h

\$(CC) \$(C++FLAGS) -c operator_property_menu.C
postpopup.o: postpopup.c gettopshell.h setcursor.h
\$(CC) \$(C++FLAGS) -c postpopup.c

report_enrors.o: report_enrors.C ge_interface.h graph_editor.h windows.h \
ge_utilities.h warning.h action_area.h
\$(GC) \$(G+FLAGS) -c report_enrors.C

sde.o: sde.c inter_process_utilities.h ge_interface.h sde_simulator.h \$(C) \$(CFLAGS) -c sde.c

sde_simulator.o: sde_simulator.c ge_utilities.h ge_interface.h \ sde_simulator.h inter_process_utilities.h \$(C) \$(CFLAGS) -c sde_simulator.c

setcursor.o: setcursor.c setcursor.h
\$(CC) \$(C+FLAGS) -c setcursor.c

spline_object.o: spline_object.C ge_defs.h ge_interface.h resources.h \
 spline_object.h stream_object.h graph_object.h font_table.h \
 operator_object.h ge_utilities.h warning.h
 \$(CC) \$(C+FLAGS) -c spline_object.C

stream_object.o: stream_object.C stream_object.h ge_defs.h ge_interface.h \
 resources.h graph_object.h font_table.h spline_object.h operator_object.h \
 ge_utilities.h graph_object_list.h
\$(CC) \$(C+*FLAGS) -c stream_object.C

stream_property_menu.o: stream_property_menu.C ge_defs.h ge_interface.h \
 resources.h ge_utilities.h gettopshell.h graph_editor.h windows.h \
 graph_object_list.h graph_object.h font_table.h \
 operator_object.h spline_object.h stream_object.h warning.h
 \$(CC) \$(C+FLAGS) -c stream_property_menu.C

timer_tool.o: timer_tool.C ge_defs.h ge_interface.h resources.h timer_tool.h \
ge_utilities.h graph_editor.h windows.h action_area.h warning.h
\$(CC) \$(C+FLAGS) -c timer_tool.C

warning.o: warning.C warning.h \$(CC) \$(C++FLAGS) -c warning.C windows.o: windows.C windows.h ge_utilities.h ge_interface.h warning.h \
graph.editor.h
\$(CC) \$(C+FLAGS) -c windows.C

#include <Xm/DialogS.h>
#include <Xm/PushBG.h>
#include <Xm/PushB.h>
#include <Xm/FushB.lb>
#include <Xm/Form.h>
#include <Xm/Form.h>
#include <Xm/Form.h>
#include <Xm/Form.h>
#include <Xm/Form.h>

typedef struct {
 char *label;
 void (*callback)(Widget, XtPointer, XtPointer);
 XtPointer data;
} ActionArealten;

Widget CreateActionArea(Widget, ActionAreaItem*, int); void close_dialog(Widget, XtPointer, XtPointer); void clear_pushed(Widget, XtPointer, XtPointer);

#endif

#ifndef ACTION_AREA_H #define ACTION_AREA_H 1 #define TIGHTNESS 20

```
XmNrightAttachment, i != num_actions - 1 ? XmATTACH_POSITION : XmATTACH_FORM, XmNrightPosition, TIGHINESS * i + (TIGHINESS -1),
widget = XtVaCreateManagedWidget(actions[i].label,
xmPushButtonWidgetClass, action_area,
XmNleftAttachment, i? XmATTACH_POSITION : XmATTACH_FORM,
XmNleftPosition, TIGHINESS * i,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaGetValues(action_area, XmNmarginHeight, &h, NULL);
XtVaGetValues(widget, XmNheight, &height, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                 XtAddCallback(widget, XmNactivateCallback,
actions[i].callback, actions[i].data);
                                                                                                                                                                    XmNbottomAttachment, XmATTACH_FORM,
                                                                                                                                                                                                                                                                                                            XmNdefaultButtonShadowThickness, 1,
                                                                                                                                        XmNtopAttachment, XmATTACH_FORM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            height += 2 * h;
XtVaSetValues(action_area,
XmNdefaultButton, widget,
XmNpaneMaximum, height,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtManageChild(action_area);
                                                                                                                                                                                                                                                                             XmNshowAsDefault, i == 0,
                                                                                                                                                                                                                                                                                                                                                                               if(actions[i].callback)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KmNpaneMinimum, height,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Dimension height, h;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return action_area;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(i==0) {
                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget CreateActionArea(Widget parent, ActionAreaItem *actions, int num_actions) { NULL);
                                                                                                     void close_dialog(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void clear_pushed(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            action_area = XtVaCreateWidget("action_area", xmFormWidgetClass, parent,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNfractionBase, TIGHTNESS*num_actions -1,
XmNleftOffset, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget text_w = (Widget)client_data;
                                                                                                                                                                    Widget shell = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmTextFieldSetString(text_w, "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      for(i=0; i<num_actions; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget action_area, widget;
                                  #include "graph_editor.h"
#include "action_area.h"
                                                                                                                                                                                                                                                                                                               XtDestroyWidget(shell);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNrightOffset, 10,
                                                                                                                                                                                                                                             clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int i;
```

```
XtSetArg(args[0], XmNsubMenuId, menu);
XtSetArg(args[1], XmNlabelString, str);
/* This really isn't a cascade, but this is the widget handle
* we're going to return at the end of the function.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /* Option menus are a special case, but not hard to handle */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (menu_type == XmMENU_PULLDOWN || menu_type == XmMENU_OPTION)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   menu = XmCreatePulldownMenu(parent, "_pulldown", NULL, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 cascade = XmCreateOptionMenu(parent, menu_title, args, 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtWarning("Invalid menu type passed to BuildMenu()");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              menu = XmCreatePopupMenu(parent, "_popup", NULL, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* Pulldown menus require a cascade button to be made */
if (menu_type == XmMENU_PULLDOWN) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        cascade = XtVaCreateManagedWidget(menu_title,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             str = XmStringCreateSimple(menu_title);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  str = XmStringCreateSimple(menu_title);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 xmCascadeButtonGadgetClass, parent,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      } else if (menu_type == XmMENU_OPTION) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   menu_mnemonic,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else if (menu_type == XmMENU_POPUP)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      menn,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget menu, cascade, widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNlabelString, str,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* Now add the menu items */
                         char *menu_title, menu_mnemonic;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsubMenuId.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmStringFree(str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNmnemonic,
                                                                                                                                                                                                                                                                                                                                  char menu_mnemonic,
                                                                                                                                                                                                                                                                                                                                                                                                                        #endif /* _NO_PROTO */
                                                                                                                                                                                                                                                                                                   char *menu_title,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Arg args[2];
                                                                                                                                                                                                                                                                                                                                                              MenuItem *items)
                                                                                                                                                                                                                                            Widget parent,
                                                                                                                                                                                                                                                                        int menu_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KmString str;
                                                          MenuItem *items;
int menu_type;
                                                                                                                                                                                                        BuildMenu(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
                                                                                                                    #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * return the CascadeButton that pops up the menu. Popups return the menu.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * It may be XmMENU_PULLDOWN, XmMENU_OPTION or XmMENU_POPUP. Pulldowns
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * Option menus are created, but the RowColumn that acts as the option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /* Build popup, option and pulldown menus, depending on the menu_type.
                                                                                                                                                                                                  * Written by Dan Heller. Copyright 1991, D'Reilly && Associates.

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* This program is -not- in the public domain.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            * Pulldown menus are built from cascade buttons, so this function
                                                                                                                                                                                                                                                                                                                                                                                          * build_option.c -- The final version of BuildMenu() is used to * build popup, option, pulldown -and- pullright menus. Menus are * defined by declaring an array of MenuItem structures as usual.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           * also builds pullright menus. The function also adds the right
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      BuildMenu(parent, menu_type, menu_title, menu_mnemonic, items)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * "area" is returned unmanaged. (The user must manage it.)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * callback for PushButton or ToggleButton menu items.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Migration from Motif 1.2 to Motif 1.1.
                                                          op_prop_formal_desc.C
                                                                                        Lange and Anunciado
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             @1 96/09/29 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     <Xm/CascadeBG.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #include "build_option.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             <Xm/ToggleBG.h>
<Xm/PushB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         <Xm/DrawingA.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              <Xm/ToggleB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #include <Xm/PushBG.h>
                                                                                                                 graph_editor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  <Xm/PanedW.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                <Xm/MainW.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Widget parent;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #include #include
                                                                                                                          Program:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 History:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #include
                                                                                                                                                   Remarks:
                                                                                           Author:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #endif
                                                             Name:
```

```
/* for popup menus, just return the menu; pulldown menus, return * the cascade button; option menus, return the thing returned * from XmGreateOptionMenu(). This isn't a menu, or a cascade button!
                                      /* any item can have an accelerator, except cascade menus. But,
    * we don't worry about that; we know better in our declarations.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (items[i].widget_class == &xmToggleButtonWidgetClass ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       items[i].widget_class == &xmToggleButtonGadgetClass)?
XmNvalueChangedCallback : /* ToggleButton class */
XmNactivateCallback /* PushButton class */
items[i].callback items[i].callback_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             } /* Close scope of 'extern "C"' declaration which encloses file. */
                                                                                                                                                                                 str = XmStringCreateSimple(items[i].accel_text);
XtVaSetValues(widget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return menu_type == XmMENU_POPUP? menu : cascade;
                                                                                                                                                                                                                                                      XmNaccelerator, items[i].accelerator,
XmNacceleratorText, str,
                                                                                                                                                 if (items[i].accelerator)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtAddCallback(widget,
                                                                                                                                                                                                                                                                                                                                                                                XmStringFree(str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (items[i].callback)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef __cplusplus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4
                                                                                                                                                                                                                       if (menu_type == XmMENU_DPTION) {
   XtHarning("You can't have submenus from option menu items.");
                                      /* If subitems exist, create the pull-right menu by calling this * function recursively. Since the function returns a cascade
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtVaSetValues(widget, XmNmnemonic, items[i].mnemonic, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* Whether the item is a real item or a cascade button with a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     widget = XtVaCreateManagedWidget(items[i].label,
                                                                                                                                                                                                                                                                                                                                                                                widget = BuildMenu(menu, XmMENU_PULLDOWN,
                                                                                                                                                                                                                                                                                                                                                                                                                      items[i].label, items[i].mnemonic,
                                                                                                               * button, the widget returned is used ..
for (i = 0; items[i].label != NULL; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          * menu, it can still have a mnemonic.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *items[i].widget_class, menu,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (items[i].act_display == True)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtSetSensitive(widget, False);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (items[i].sensitive != True)
                                                                                                                                                                                                                                                                                                                                                                                                                                                            items[i].subitems);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNmenuHistory, widget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues (menu,
                                                                                                                                                                                        if (items[i].subitems)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (items[i].mnemonic)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* Set sensitivity of widget.
                                                                                                                                                                                                                                                                                                              continue;
                                                                                                                                                                                                                                                                                                                                             } else
```

```
static void set_error_tgt(Widget widget) {_error_tgt = widget;}
                                                                                                                                                                                                 struct _font_record _font_table[MAXFONTS + 1];
static Widget _error_tgt;
                                                                                                                                                                                                                                                                                                                                                                                 "FontTable();
void init(Display *display_ptr);
int vidth(int font_id, char *in_string);
int height(int font_id);
Font font_id(int font_id);
char *font_name(int font_id);
struct _font_record {
  char *_name_ptr;
  XFontStruct *_font_ptr;
                                                                                                                                                   class FontTable {
                                                                            int _height;
                                                                                                                                                                                                                                                                                                                                                          FontTable();
                                                                                                                                                                                 private:
                                                                                                                                                                                                                                                                           public:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #endif
                                                                                                                                                                                                                                                                                                                                                                                     The FontTable contains all the necessary information about the fonts used in the graph editor, allowing the program to refer to them by a font id#.
                                                                                                                                                                                                                                                                                                         It initializes with six predefined font names, although more could easily be added.
```

Remarks: Specification for the FontTable object.

Name: font_table.h Author: Capt Robert M. Dixon Program: graph_editor Date Modified: 12 Sep 92

#include <stdlib.h>
#include <X11/Xlib.h>
#include <X11/Intrinsic.h>

#ifndef FONT_TABLE_H #define FONT_TABLE_H 1

#include <Xm/MessageB.h> #include <string.h> #include "ge_defs.h"

```
_font_table[COURIERMED14]._name_ptr = dup_str("*adobe-courier-medium-r*140*");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        dup_str("*adobe-courier-medium-r*100*");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   dup_str("*adobe-courier-medium-r*120*");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _font_table[COURIERBOLD10]._name_ptr = don_ier-bold-r*100*");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 dup_str("*adobe-courier-bold-r*120*");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             dup_str("*adobe-courier-bold-r*140*");
                                                                                                                                                                                                                                                                                                // Initializes the font table using fonts defined for the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XLoadQueryFont(display_ptr, _font_table[0]._name_ptr);
_font_table[CGURIERBULD10]._font_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _font_table[COURIERBOLD10]._name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XLoadQueryFont(display_ptr,
    _font_table[CGURIERBGLD14]._name_ptr);
_font_table[CGURIERMED10]._font_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _font_table[CUURIERBULD14]._font_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _font_table[COURIERMED12]._name_ptr);
_font_table[COURIERMED14]._font_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _font_table[COURIERMED10]._name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _font_table[CUURIERMED14]._name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          dup_str("variable");
                                                                                                                                                                                                                                                                                                                                                                                                void FontTable::init(Display *display_ptr) {
                                                                            // delete_font_table[i]._name_ptr;
free(_font_table[i]._name_ptr);
                                                                                                                                                // delete _font_table[i]._font_ptr;
free((char*)_font_table[i]._font_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _font_table[COURIERBOLD12]._name_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _font_table[COURIERBOLD14]._name_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _font_table[COURIERBOLD12]._font_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _font_table[COURIERMED10]._name_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _font_table[COURIERMED12]._name_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _font_table[COURIERMED12]._font_ptr =
                                                     for(i = 1; i <= MAXFONTS; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XLoadQueryFont(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XLoadQueryFont(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XLoadQueryFont(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XLoadQueryFont(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XLoadQueryFont (display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                         _font_table[0]._name_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _font_table[0]._font_ptr =
                                                                                                                                                                                                                                                                                                                                     // given display.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   The FontTable contains all the necessary information about the fonts used in the graph editor, allowing the program to refer to them by a font id#.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Young, Douglas, Object Oriented Programming With C++ and OSF/Motif, Prentice-Hall, 1992.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Heller, Dan, Motif Programming Manual, O'Reilly and
                                                                                                                                                                                                                                                                                                                                                                                                                               Portions of code are adapted from the following:
                                                                                                                                                                                                                                                                                                   It initializes with six predefined font names, although more could easily be added.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Johnson, Eric, and Reichard, Kevin, X Window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Applications Programming, MIS Press, 1989.
                                                                                                                   Implementation of the FontTable object.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // Initializes static class variable.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Widget FontTable::_error_tgt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _font_table[i]._name_ptr = NULL;
_font_table[i]._font_ptr = NULL;
                         Capt Robert M. Dixon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      for(i = 1; i <= MAXFONTS; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Associates, 1991.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #include <stdio.h>
#include "font_table.h"
#include "ge_utilities.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 FontTable:: FontTable() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FontTable::FontTable() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #include "warning.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef GE_DEBUG
                                                                                       Date Modified:
                                                                                                                      Remarks:
                                                                                                                                                                                                                                                                                                                                                                                                                                     Credits:
                                                              Program:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int i:
                            Author:
Name :
```

printf("FontTable Destructor: array of _name_ptr and _font_ptr\n");

```
warning(_error_tgt, "Font Table entered with font too big.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     warning(_error_tgt, "Font Table entered with font too big.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             warning(_error_tgt,"Font Table entered with font too big.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // Returns font information needed by some X functions.
   in_string, strlen(in_string));
                                                                                                           // Returns the height of the given font in pixels.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return _font_table[font_id]._font_ptr->fid;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return _font_table[font_id]._name_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char *FontTable::font_name(int font_id) {
                                                                                                                                                                                                                                                                           return _font_table[font_id]._height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Returns the name of the given font.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Font FontTable::font_id(int font_id) {
                                                                                                                                                                             int FontTable::height(int font_id) {
                                                                                                                                                                                                                                       if(font_id <= MAXFONTS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(font_id <= MAXFONTS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(font_id <= MAXFONTS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return 0;
                                                                                                                                                                                                                                                                                                                                                                                             return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                         else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         warning(_error_tgt,"Font Table entered with font too big.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // Returns the width of the given string in the given font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return XTextWidth(_font_table[font_id]._font_ptr,
                                                                                                                                         _font_table[COURIERBOLD10]._height =
_font_table[COURIERBOLD10]._font_ptr->ascent +
_font_table[COURIERBOLD10]._font_ptr->descent;
                                                                                                                                                                                                                                                                                  _font_table[CGURIERBOLD12]._height =
_font_table[CGURIERBOLD12]._font_ptr->ascent +
_font_table[CGURIERBOLD12]._font_ptr->descent;
                                                                                                                                                                                                                                                                                                                                                                                                                           _font_table[COURIERBOLD14]._height =
_font_table[COURIERBOLD14]._font_ptr->ascent +
_font_table[COURIERBOLD14]._font_ptr->descent;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int FontTable::width(int font_id, char *in_string) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _font_table[CGURIERMED12]._font_ptr->ascent + _font_table[CGURIERMED12]._font_ptr->descent;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _font_table[COURIERMED14]._height =
_font_table[COURIERMED14]._font_ptr->ascent +
_font_table[COURIERMED14]._font_ptr->descent;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _font_table[COURIERMED10]._font_ptr->ascent + _font_table[COURIERMED10]._font_ptr->descent;
                                                                       _font_table[0]._font_ptr->descent;
_font_table[0]._height =
_font_table[0]._font_ptr->ascent +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _font_table[COURIERMED10]._height =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _font_table[COURIERMED12]._height =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(font_id > MAXFUNTS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(in_string == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // in pixels.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return 0;
```

/* Return codes used to tell the syntax-directed editor what to do with the incoming data, and whether any #define FAILED 0
#define INUT_LINE_SIZE 100
#define CIRCLE_BEGIN 0
#define FULL_CIRCLE 360 * 64
#define HANDLESIZE 5 level changes are required. #define NULL_VALUE O #define FROM_EXTERNAL 1 #define TO_EXTERNAL 2 #define NO_EXTERNAL O #define ENDED 2 #define SUCCEEDED 1 #define NOUPDATE -4 #define HITFUDGE 5 #define ERROR -3 #define SAME 0 #define UP -1 onum TOOL_STATE{OPERATOR_IOOL, TERMINATOR_TOOL, STREAM_TOOL, SELECT_TOOL,
TYPES_TOOL, SPEC_TOOL, TIMERS_TOOL, INFORMAL_TOOL); /* BOOLEAN, TRUE and FALSE defined */ Name: ge_defs.h.
Author: Capt Robert M. Dixon
Program: graph_editor
Date Modified: 12 Sep 92
Remarks: Provides the common type definitions and defines for the modules in the graph_editor program. enum CLASS_DEF{GRAPHOBJECT, OPERATOROBJECT, STREAMOBJECT,
GRAPHOBJECTLIST, SPLINEOBJECT}; enum DRAW_STYLE{SOLID, DOTTED, ERASE}; #include "ge_interface.h" typedef int GE_STATUS; typedef int EXTERN_STATUS; typedef int COLOR; #ifndef ge_defs_h #define ge_defs_h 1

#include "resources.h" #endif

#define MAXTEXTLINES 100

typedef struct xypair {

int x, y; } XYPAIR;

```
sleep(10000); /* Give SDE time to kill process
   /* Needed so that the pipe is not killed before the */
   /* SDE has time to read it.
*/
                                                                                                                                                                                                                                                                                                                                                                                                           edit_graph(current_graph, action, sde_error_msgs);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf("\nGE Xfer Buffer size: %d\n", xfer->Max);
                                                                                                                                                                                                                                                                                                                                                                                                                                            /* urite data back to sde */
uriteGraphDesc(current_graph, xfer, ge_out);
uriteAction(action, xfer, ge_out);
                                                                                                                                                                                                                                                                                                                                                                readErrorMsgs(&sde_error_msgs, rfer, ge_in);
                                                                                                                                                                                                                                                                                                                                              readGraphDesc(current_graph, xfer, ge_in);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("Error communicating with SDE\n");
                                                                                                                                                                                                                                                      /* Loop until no longer reinvoked. */
while (next_action.reinvoke) {
sscanf(argv[1], "%d", &ge_in);
sscanf(argv[2], "%d", &ge_out);
                                                                                                                                                                    readChkWord(&chkWord, ge_in);
vriteChkWord(chkWord, ge_out);
                                                                                                       next_action.reinvoke = true;
                                                                                                                                                                                                                                                                                                                         /* read data from sde */
                                                                                                                                                                                                                                   if (chkWord == CHKWORD) {
                                                              init_id_server();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           close(ge_out);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    close (ge_in);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif
                                                                                                                                                                                                                                     current_graph = &graph;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  action = &next_action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           sde_error_msgs = NULL;
                                                                                                                                                                                                                                                                                                 #include "inter_process_utilities.h"
#include "graph_editor.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     init_graph_desc(current_graph);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                next_action;
                                                                                                                                                                    History:
@1 96/09/29 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      main(int argc, char *argv[])
                                                                                                                                                                                                                                                                                                                                        #include "get_unique_id.h"
                                                                                                                                                                                                                                                                                                                                                                                     extern MferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       create_xfer_buf(&xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           GRAPH_DESC_NODE graph;
                                         ge_driver.C
Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                init_action(action);
                                                                                  Program: graph_editor
Remarks:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Global_argc = argc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Global_argv = argv;
                                                                                                                                                                                                                                                                                                                                                                                                         int Global_argc;
char **Global_argv;
                                                                                                                                                                                                                                                          #include <unistd.b>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int chkWord;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     xfer = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ge_in,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ACTION_NODE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ERROR_MSGS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GRAPH_DESC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ge_out;
                                                                  Author:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int
                                              Name:
```

Name: ge_interface.h	н.		
	一個 经非常存货的现在分词 医多种性性 医多种性性 医多种性性 医多种性性 医多种性性 医二甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基甲基	***************************************	/ 李林林的女子和女子和女子和女子和女子和女子和女子和女子和女子和女子和女子和女子的女子和女子和女子和女子的女子和女子的女子的女子,他们一点,一点一点,一点一点,一点一点,一点一点,一点一点,一点一点
#ifndef GE INTERFACE H		**************************************	*****
#define GE_INTERFACE_H 1		typedef struct id_list {	
		char* id;	
typedef unsigned short BOOLEAN; /*	ZEAN;	struct id_list* next; }ID NODE. *ID LIST:	
#include "/local/syn/src/include/lang.h"	nclude/lang.h"		
/*		· *************	/ ************************************
#define US 0	/* microsec */	/* typedef for an OPERATOR	/*
#define MS 1	/* millisec */	*********	· ************************************
Ð	/* sec */	typedef struct op_str {	
#define MINUTE 3	/* min */	OP_ID id;	/* cannot be changed after creation
#define HOUR 4	/* hours */		this is equal to the vertex_num, assigned by ge and used by sde */
#define UNDEFINED_OPNUM O #define EXTERNAL_VERTEX_NU	#define UNDEFINED_OPNUM O /* constant representing undefined op num */ #define EXTERNAL_VERTEX_NUM O /* OP_ID for an external stream */	OP_ID	
#define UNDEFINED_TIME -1	#define UNDEFINED_TIME -1 /* constant representing undefined time value */	op_num; /* only	/* only assign and used by sde */
#define UNPROTECTED 0	/* no data trigger */	/* info about location of operator icon */	perator icon */
#define BY_SOME 1	/* triggered by some */	int	
#define BY_ALL 2	/* triggered by all */	H,	/* x_position of the circle's center point
		у,	/* y_position of the circle's center point
	/* non time critical */	radius,	
#define PERIODIC 1		color;	
#define SPORADIC 2	/* sporadic */		
		/* INTO about the label */	
#define BUFFER_SIZE 1000	/* use by routines in sde.string_unit.foreign.ssl */	char *label;	
	/* to note the text from from sae text capture */	int label font.	
# As fine Honard Tage 0	/* only undate internal etructure */	label x offset.	/* actual r nosition = r + label r offset *
		label v offset:	/* actual v position = v + label_v_offset *
	/* undate syntax tree and save to file */		
#define REVERT 3	/* delete syntax tree and rebuild it from file */	/* info about timing constraints */	aints */
2	/* abandon work in current level */	int	
		timing_type;	/* NTC, PERIOD, SPORADIC */
#define true (1)			
#define false (0)		/* info about MET */	
AND THE THE PROPERTY OF THE PARTY OF THE PAR	= -	int	/* INDERINED TIME if no met #/
#deline DEFAULI_IMPL_LANG AGE	AGA	######################################	/* IN MS SECOND MINISTER HOURS */
turedef int OF ACTION TVDE.	/* enumeration tune	met font	
cypeder in de_action_tife		met_rem;	/* actual x_position = x + met_x_offset */
	SAVE_TO_DISK, REVERT, ABANDON) */	met_y_offset;	/* actual y_position = y + met_y_offset */
	,	ID_LIST	
typedef unsigned int UP_ID;	/* unique identifier numbers for nDDDBATOB + # Apre	met_requts;	/* requirements trace */
typedef unsigned int ST_ID;	/* unique identifier numbers for	/* info about PERIUD */	
		int	

```
/* each (x,y) represent an interval control point */
/* for the spline, not including end points. */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* *********************************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /* list of keywords f*/
                                                                                        /* info about informal description operator spec */
                                                                                                                                                                                                                                                                               /* info about the implementation of the operator */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* is_new is set by the GE and
                                                                                                                                                                                    /* info about formal description operator spec */
/* info about key_words for operator spec */
ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cleared by the SDE' New_Dperator procedure */
is_modified,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /* typedef for a linked list of OPERATOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* typedef for SPLINE linked list
                                                                                                                                        operator_informal_desc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* info for house keeping */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           typedef struct op_list_node {
                                                                                                                                                                                                                                   operator_formal_desc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              typedef struct spline_node {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   struct op_list_node *next;
                                                                                                                                                                                                                                                                                                                                                                       /* operator properties */
                                                                                                                                                                                                                                                                                                                             operator_impl_lang;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SPLINE_NODE, *SPLINE_PTR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          HOP_LIST_NODE, *OP_LIST;
                                            key_word_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                 is_terminator;
                                                                                                                                                                                                                                                                                                                                                                                                                       is_composite,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      struct spline_node*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOP_NODE, *OPERATOR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         is_new,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OPERATOR op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    next:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BOOLEAN
                                                                                                                                                                                                           char*
                                                                                                                                                                                                                                                                                                      char*
                                                                                                                                                                                                                                                                                                                           /* UNDEFINED_TIME if no maximum response time */ /* US, MS, SECOND, MINUTE, HOUR */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* UNDEFINED_TIME if no minimum calling period*/
/* US, MS, SECOND, MINUTE, HOUR */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* parameter to be forwarded to mini-sde
EDIT_OUTPUT_GUARD(char* out_guard_list) */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /* parameter to be forwarded to mini-sde
EDIT_EXCEPTION(char* exception_list) */
                                                                                                                                                             /* UNDEFINED_TIME if no finish within */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         parameter to be forwarded to mini-sde
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /* parameter to be forwarded to mini-sde
EDIT_TIMER_OP(char* timer_op_list) */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* triggered_if condition, set to true
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           EDIT_IF_COND(char* if_condition)
                                                                                                                                                                                                                                                                                                                                                                                              *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *
/* UNDEFINED_TIME if no period */ /* US, MS, SECOND, MINUTE, HOUR */
                                                                                                                                                                                    /* US, MS, SECOND, MINUTE, HOUR */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* UNPROTECTED, BY_SOME, BY_ALL */
                                                                                                                                                                                                                                   /* requirements trace
                                                                                                                                                                                                                                                                                                                                                                                              /* requirements trace
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /* requirements trace
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /* requirements trace
                                                                   /* requirements trace
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if not specified,
                                                                                                                                                                                                                                                                                                                                                                                                                                          /* info about MINIMUM CALLING PERIOD */
                                                                                                                                                                                                                                                                               /* info about MAXIMUM RESPONSE TIME */
                                                                                                               /* info about FINISH WITHIN */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* info about output guard */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /* info about triggering */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* info about exception */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* info about timer op */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    output_guard_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              trigger_requts;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    exception_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 timer_op_list;
                                                                     period_reqmts;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      trigger_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if_condition;
                       period_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  trigger_set;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              mcp_requts;
                                                                                                                                                                                                                                                                                                                                                                                                  mrt_reqmts;
                                                                                                                                                                                                                                   fw_reqmts;
                                                                                                                                                                                                                                                                                                                                                  mrt_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              mcp_unit;
                                                                                                                                                                                    fw_unit;
  period,
                                                                                                                                                                                                                                                                                                                               mrt.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ncp,
                                                                                                                                                                                                           ID_LIST
                                                                                                                                                                                                                                                                                                                                                                         ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int
```

/* ************************************	/*typedef for a linked list of STREAM	人名比萨克斯伊斯斯伊斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯	STREAM st;	<pre>rfset */ }ST_LIST_NODE, *ST_LIST; ffset */</pre>			****	typedef struct attributes_list {	chart attr;	ID_LIST reqmts; struct attributes_list *next;	:splay*/ }AT_NODE, *AT_LIST;		/* typedef for the graph description structure **/ /********************************	typedef struct graph_desc_node{ /* From SDE to GE */	char* root_op_name;	* .	char* parent_op_name; /* name of the parent of the current of	<pre>the parent of the root operator is */ fiset*/ int. parent op num: /* unique op num of the parent operator */</pre>	char* current_op_name;		int current_op_num; /* unique op_num of the current operator */		ST_LIST input_list; /* list of input streams */	/* NOTE: only label, label font, stream type na	state_initial_value, is_state_variable are	meaningful in the input_list and output_list */	/* From SDE to GE */	cur_op_spec_met; /* MET is kept	int cur_op_spec_mer_unit; /* interrace. Still, only the reques can */ /* MTS 11/25/96	change cur_op_is_terminator from int to BOULEAN */	BOOLEAN cur_op_is_terminator;		A STATE OF THE PERSON OF THE PERSON AND A STATE OF THE PERSON AS A STAT
<pre>typedef struct st_str{ ST_ID id; /* cannot be changed after creation */</pre>	1. 1-6. strong taken al	/* inic about tabel */	int int	label_x_offset, /* actual x_position = x_mid_point + label_x_offset */ label_y_offset; /* actual Y_position = y_mid_point + label_y_offset */	/* x_mid_point = 0.5 * (from->x + to->x)	(K)_00 + K/_H011) + 0:0 - 0H10A-H1H-K +/	/* the two endpoints of the stream */	dr_qo	from,	to;	/* linked list of SPLINE_NODE defining the shape of the edge on the display*/ SPLINE PTR	arc; /* null pointer if the arc is a		/* info about LATENCY */	idno */	latency_unit, /* US, MS, SECOND, MINUTE, HOUR */		<pre>latency_r_offset, /* actual x_position=x_mid_point+latency_x_offset*/ latency v offset: /* actual Y position=v mid point+latency v offset*/</pre>		/* stream type */	Char* stream type name:	/* initial value if it is a state stream */	Char*	scare_initate_value;	/* stream visible properties */	BOOLEAN	1S_state_variable;	/* info for house keeping */	BUDLEAN /* is new is set by the GE and			is_modified,	

}ST_NODE, *STREAM;

	/* is edited with mini-sde.	/ char*	next_op;	/* name of the next operator to be edited,	ited,
				only meaningful if reinvoke == true	/* •
/* Bi-directional between SDE and GE	SDE and GE */	int	next_op_num;	next_op_num; /* set to UNDEFINED_OPNUM if next_op is	is
OP_LIST operator_list;				a newly created bubble	*
ST_LIST stream_list;		} ACTION_ND	<pre>} ACTION_NODE, *ACTION;</pre>		
ID_LIST timer_list;					
char* graph_informal_desc;	380;				
		******	******	/* ***********************************	
/* From SDE to GE */		/* typedef	/* typedef for the ERROR_MSGS type	type */	
ID_LIST avail_impl_langs;	/* An ID_LIST of available languages from */		***********	*********************************	
			typedef struct error_node {		
		OP_ID pa	OP_ID parent_op_num;	/* Parent is the operator above the */	\
/* Bi-directional between SDE and GE	1 SDE and GE */	char* pa	char* parent_op_label;	/* operator with the error *	_
char* global_types;	/* SDE output of all types	OP_ID cu	cur_op_num;		
		char* cu	char* cur_op_label;		
}GRAPH_DESC_NODE, *GRAPH_DESC;	SSC;	char* msg;	::0	/* Text of error message *	_
		struct er	struct error_node *next;		
		} ERROR_NOD	} ERROR_NODE, *ERROR_MSGS;		
**************************************	· **********************				
/* typedef for the ACTION type	/* adk:				
*********	*********************************	#endif			
typedef struct action_node {	ļ				
GE_ACTION_TYPE option;	/* UPDATE_TREE, CHECK_SYNTAX, SAVE_TO_DISK,				
	REVERT, ABANDON */				
BOOLEAN reinvoke:	reinvoke: /* true if need to reoben GE */				

<pre>fistory: el 96/10/07 Ken Moeller Changes to ge_interface_labels.h Changes to ge_interface.h changes to ge_interface.h changes to ge_interface.h changes to ge_interface.h tetindef GE_INTERFACE_LABELS_H tetic char *time_units[] = {</pre>	static char *ID_label_font = static char *ID_label_x_offset = static char *ID_label_x_offset = static char *ID_label_y_offset = static char *ID_latency_ont = static char *ID_latency_unit static char *ID_latency_unit static char *ID_latency_v_offset = static char *ID_latency_v_offset = static char *ID_ncp_reques = static char *ID_ncp_		
### ge_interface_labels.h ###################################	static char *1b_label_font static char *1b_label_x_offset static char *1b_label_y_offset static char *1b_latency static char *1b_latency_font static char *1b_latency_unit static char *1b_latency_unit static char *1b_latency_x_offset static char *1b_latency_y_offset static char *1b_latency_s_static static char *1b_latency_s_static static char *1b_ncp_requts static char *1b_ncp_ncp_requts		
1 96/10/07 Ken Moeller	static char *lb_label_x_offset static char *lb_label_y_offset static char *lb_latency static char *lb_latency_font static char *lb_latency_unit static char *lb_latency_unit static char *lb_latency_x_offset static char *lb_latency_y_offset static char *lb_latency_s_sfset static char *lb_ncp_requts static char *lb_ncp_requts		
tory: Changes to ge_interface.h therewereseesesesesesesesesesesesesesesese	<pre>static char *lb_label_y_offset static char *lb_latency static char *lb_latency_font static char *lb_latency_unit static char *lb_latency_woffset static char *lb_latency_v_offset static char *lb_latency_y_offset static char *lb_latency_s_static static char *lb_mcp_requts static char *lb_mcp_requts static char *lb_mcp_requts</pre>		
Changes to ge_interface.h Changes to ge_interface.h indef GE_INTERFACE_LABELS_H frine GE_INTERFACE_LABELS_H tric char *time_units[] = { Undefined_Time", VUS", VUS", VUSCOND", VISC", VINCTECTED", PERIODIC", PERIODIC", SPORADIC"]; tric char *timing_types[] = { VINC", <pre>static char *lb latency static char *lb.latency_font static char *lb.latency_unit static char *lb.latency_unit static char *lb.latency_v_offset static char *lb_ncp static char *lb_ncp static char *lb_ncp static char *lb_ncp static char *lb_ncp static char *lb_ncp</pre>			
Changes to ge_interface.h Changes to ge_interface.h ***********************************	<pre>static char *lb_latency_font static char *lb_latency_unit static char *lb_latency_x_offset static char *lb_latency_y_offset static char *lb_mcp static char *lb_mcp static char *lb_mcp_requts static char *lb_mcp_requts</pre>		
Changes to ge_interface.h ***********************************	static char *lb.latency_unit static char *lb.latency_x_offset static char *lb.latency_y_offset static char *lb.mcp static char *lb.mcp_requts static char *lb.mcp_requts		
######################################	static char *Lo_intentyoiisec static char *Ib_intency_y_offset static char *Ib_mcp_requts static char *Ib_mcp_requts static char *Ib_mcp_unit		
<pre>def GE_INTERFACE_LABELS_H fine GE_INTERFACE_LABELS_H tic char *time_units[] = { Undefined_Time", US", WS", WS", WSTOUD", HUNTUTE; HOUR" }; tic char *timing_types[] = { WRINUTE; BY_ALL" }; tic char *timing_types[] = {</pre>	static char *lb_mcp static char *lb_mcp_requts static char *lb_mcp_unit	= "latency_v_offset";	
	char *lb_mcp_reqmts char *lb mcp unit		
	char *1b mcp unit		
	static char *lb_met =	"Het";	
	static char *lb_met_font =		
	static char *Ib_met_requts ==		
	static char *lb_met_unit ==	= "met_unit";	
	static char *lb_met_x_offset =		
	static char *lb_met_y_offset =		
	static char *lb_mrt =	= "mrt";	
	static char *Ib_mrt_reqmts =	= "mrt_reqmts";	
	static char *lb_mrt_unit =		
	static char *lb_op_num =		/* 01 */
	static char *lb_operator_formal_desc =		
	static char *Ib_operator_impl_lang ==	= "operator_impl_lang";	
	static char *lb_output_guard_list ==	= "output_guard_list";	
tion_list = = = = = = = = = = = = = = = = = = =	static char *lb_period ==		
tion_list = manufactured it	static char *Ib_period_requts ==		
tion_list = = quts	char		
tion_list = = quts	char *lb_radius		
tion_list = = = = = = = = = = = = = = = = = = =	char		
*1b_exception_list = *1b_from = *1b_from = *1b_fv	char *1b_stream_type_name		
*1b_from	char *lb_timer_op_list		
*1b_fw = *1b_fw_reqmts = *1b_fw_unit = *1b_f	char *lb_timing_type		
*lb_fw_requts = *lb_fw_unit =	char		
*lb_fw_unit = =	static char *lb_trigger_requts =		
about the side	static char *lb_trigger_set =		/* 01 */
cuar *Io_ia	static char *lb_trigger_type ==	<pre>"trigger_type";</pre>	
tatic char *lb_if_condition = "if_condition";	static char *lb_x =	"x" =	
Ħ	static char *lb_y =	" h";	
"			
ified =			
Ħ	#endif		
able =			
tatic char *1b_is_terminator = "is_terminator";			

* *	典 医格莫特特氏性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性性	013 96/12/2 M.T.Shing	
ame:	ge_utilities.h	שמת נסתניוופס כס כסלא הנ"דיני שוות כו"דיניי	
uthor:		/* 法法律法法保证法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法	
rogram: ate Mod	rogram: graph_editor ate Modified: 5 Oct 96	#ifndef GE_UTILITIES_H #define GE_UTILITIES_H 1	
his i	his is basically a slightly more object	#include <string.h></string.h>	
rient	riented view of the ge_interface structures	#include "ge_interface.h"	
***	*******************		
istory:	·4:	extern "C" { #endif #endif	
5	96/10/05 Ken Moeller Seemel itams care not heing ralessed, but set to MIII	#1644 ND DROTO	
		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
9	96/10/05 Ken Moeller	<pre>ID_LisT id_list_copy(); void id_list_release();</pre>	
	Added a routine for making a string which contains the time and units.	void id_list_replace();	
6	76/10/06 Ken Mc-1	void op_release(); OPERATOR on conv():	
}	New routine for returning an OPERATOR pointer for a		
	given Operator id.	<pre>void op_list_release(); Ob ICT on list comm();</pre>	
49	96/10/18 Ken Moeller		
	New routine for validating a PSDL integer_literal	SPLINE_PTR arc_copy();	
6	96/10/18 Ken Moeller	void arc_release();	
:	New routine for testing text to see if it is all white snee.	STREAM st_copy(); /* @13 */	
		void st_list_release();	
90	96/11/25 N.T. Shing	ST_LIST st_list_copy(); /* @13 */	
	וופא וכחידום זכן ככללזות? ופלדמכונות מחור ופדפמפונות כי או"הוכן	void graph_release();	
20	96/11/25 Ken Moeller New routine for validating a PSDL id	void init action();	
		void init_graph_desc();	
8	96/11/25 Ken Moeller New routine for determining if an id is a PSDL keyword	<pre>void init_operator(); void init_stream();</pre>	
6	96/11/27 M.T. Shing Add routine to search AT_LIST	<pre>void err_msgs_release();</pre>	
		char* time_with_units();	
010	96/11/27 Ken Moeller New routine to validate a PSDL op_id	<pre>OPERATOR operator_id_ptr(); char* dup_str();</pre>	
011	96/11/27 Ken Moeller	BOOLEAN valid_num_string();	
		BOOLEAN valid_id(); /* @7 */	
012	96/11/27 Ken Moeller New routine to validate a PSDL type_name	/* @11 /* @10	
		BUULEAN valid_type_name(); /* @12 */	

BOOLEAN is kevword():		void init_stream(STREAM StPtr);	
BDDLEAN white space():	/* 80 */		
		void err_msgs_release(ERROR_MSGS *ErrPtr);	
AT_LIST at_list_copy();	/* 90 */		
void at_list_release();	/* 90 */	char* time_with_units(int time, int unit);	/* 05 */
void at_list_replace();	/* 90 */	OPERATOR operator_id_ptr(OP_LIST ptr, int id);	/* @3 */
		char* dup_str(char* ptr);	
#else		BOOLEAN valid num string(char *num);	
ID LIST id list copy(ID LIST v):		BOOLEAN valid_integer_literal(char *num, int *value); /* 04 */	/* 00 */
void id_list_release(ID_LIST X);		BOOLEAN valid_id(char *id);	/* 4 4
void id_list_replace(ID_LIST *x, ID_LIST y);		BUOLEAN parse_id(char *ID, int *idLen,	/* Q11 */
		BOOLEAN allow_types);	
void op_release (OPERATOR X);		BOOLEAN valid_op_id(char *opID);	/* @10 */
OPERATOR on conv(OPERATOR X);	/* 013 */	BOOLEAN valid_type_name(char *typeName);	/* @12 */
		BOOLEAN is_keyword(char *id, BOOLEAN allow_types);	/* @B */
void op_list_release(OP_LIST X);		BOOLEAN white_space(char *text);	/* GD */
OP_LIST op_list_copy(OP_LIST X);	/* 013 */		
		AT_LIST at_list_copy(AT_LIST y);	/* 90 */
SPLINE PIR arc copy(SPLINE PIR v):		; Cx	/* 90 */
void are release (Spline PTR X):		LIST y);	/* 90 */
void st_release(STREAM X);		AT_LIST at_list_search(char *label, AT_LIST y);	/* 60 */
STREAM st_copy(STREAM X);	/* @13 */	#endif	
void st_list_release(ST_LIST X);		#ifdefcplusplus	
	/* 013 */	4	
		#endif	
void graph_release(GRAPH_DESC x);			
		#endif	
<pre>void init_action(ACTION act); void init_graph_desc(GRAPH_DESC gdPtr); void init_operator(OPERATOR OpPtr);</pre>			

014	96/11/27 New routin	<pre>416 96/12/2 M.T.Shing Add routines to copy OP_LIST and ST_LIST. ************************************</pre>	#include <ctype.h> #include <ctype.h> #include <ctype.h> #include <ctype.h></ctype.h></ctype.h></ctype.h></ctype.h>	#include "ge_utilities.h" #iifdefcplusplus	#endif /************************************	* Written by Doug Lange 9/8/96. Builds and returns an ID_LIST * Deep copy of an ID_LIST. The new ID_LIST may be modified in	* chat any lo_nuor with an in or nuch will be returned with an * * ID containing an empty string (""). * **********************************	Filer_ind_for ID_LIST id_list_copy(y) ID_LIST y;	#else ID_LIST id_list_copy(ID_LIST y) {	#endix /* y is the original ID_LIST, x is the new ID_LIST,	temp1 is used to build the new ID_LIST, temp2 is used to step through the original ID_LIST. */ ID_LIST temp1, temp2;	if (y != NULL) {	x-nexc = Noll; $temp1 = x;$ $temp2 = y;$	while (temp2 != NULL) { temp1->id = dup_str(temp2->id);	<pre>if (temp2->next != NULL) { temp1->next = (ID_LIST) malloc(sizeof(ID_NODE)); /* @5 */ temp1 = temp1->next;</pre>
*	Author: Lange Program: graph_editor Date Modified: 5 Oct 96		96/10/05 Ken Moeller Several items were not being released, but set to NULL instead.	96/10/05 Ken Moeller Added a routine for making a string which contains the time and units.	96/10/06 Ken Moeller New routine for returning an OPERATOR pointer for a given Operator id.	96/10/07 Ken Moeller Moved utility. A to ge_utilities in order to group all ge_interface routines in one area.	96/10/07 Ken Moeller Changed dynamic memory over from C++ to C versions.	96/10/07 Ken Moeller Changes made to support changes in ge_interface.h.	96/10/07 Ken Moeller New routines to handle streams and splines.	96/10/18 Ken Moeller New routine to validate a PSDL integer_literal	96/10/18 Ken Moeller New routine to check if text consists only of white space.	96/11/25 M.T. Shing New routine for copying, replacing and releasing of AT_LIST	96/11/25 Ken Moeller New routine to validate a PSDL id	96/11/27 M.T. Shing Add routine to search AT_LIST	96/11/27 Ken Moeller New routine to validate a PSDL op id

```
/* @1 was commented out */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* @1 was commented out */
                                                                                                                                                                                                                                                                                                                                                                                                          **********************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = NULL;
= NULL;
= NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    X->operator_informal_desc = NULL;
                                                                                                                                                                                                                                                                                                                                         OP_NODE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               X->operator_formal_desc
                                                                                                                                                                                                                                                                                                                  * Manages operators and their lists Doug Lange 9/11/96
* Recovers all dynamic memory contained within the OP_NODE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      X->operator_impl_lang
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* 90 */
                                                                                                    printf("ERROR: id_list_replace to a NULL location.\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     X->output_guard_list
                                                                                                                                                                                                                                                                                                                                                                                     * @5 changed over to C dynamic memory library functions.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            X->exception_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   X->timer_op_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (->if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           X->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            id_list_release(X->trigger_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           id_list_release(X->period_requts); X->period_requts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      id_list_release(X->key_word_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(X->operator_informal_desc);
free(X->operator_formal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              id_list_release(X->trigger_set);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   id_list_release(X->mcp_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               id_list_release(X->met_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       id_list_release(X->mrt_requts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     id_list_release(X->fw_requts);
                                                                                                                                                                                                                                                                                                                                                              * memory itself is not recovered.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(X->operator_impl_lang);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free(X->output_guard_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void op_release (UPERATOR X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               X->trigger_requts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              free(X->exception_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(X->timer_op_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              free(X->if_condition);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   X->trigger_set = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            X->mrt_requts = NULL;
                      *x = id_list_copy(y);
                                                                                                                                                                                                                                                                    * op_release(OPERATOR X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        X->met_requts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          X->mcp_requts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  X->fw_reqmts = NULL;
id_list_release(*x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free(X->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (X != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                     void op_release(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                else {
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OPERATOR X;
                                                                                                                                 #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #else
                                                                                                                                                                                                                                                                                                                                           * Written by Doug Lange 9/8/96. Replaces what was in x with y while
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * This routine performs a deep copy replacement of one ID_LIST with
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* 65 */
/* 65 */
/* will return NULL on exit */
                                                                                                                                                                                                                                                                                                                    * Recovers all dynamic memory allocated to an ID_LIST.
                                                                                                                                                                                                                                                                                             * Written by Doug Lange 9/8/96. Releases cells.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* delete x's cells */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void id_list_replace(ID_LIST *x, ID_LIST y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * id_list_replace(ID_LIST *x, ID_LIST y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            woid id_list_release(ID_LIST X) {
                                                                                                                                                                                                                                               * id_list_release(ID_LIST X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        * ensuring releasing cells.
                         temp2 = temp2->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void id_list_replace(x, y)
temp1->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                     void id_list_release(X)
ID_LIST X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while (X != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp1 = X->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free((char *)X);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        * another ID_LIST.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (x \mid i = NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ID_LIST temp1;
                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                                                                                   return(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(X->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                  return(x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           X = temp1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ID_LIST *x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ID_LIST y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return;
                                                                                                                6156
```

```
* Dep copy of an OP_LIST.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 <del>/***********************</del>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /* kbm */
/* kbm, also need to free OP_LIST_NODE */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     016
                                                                                                                                    temp_op->operator_informal_desc = strdup(X->operator_informal_desc);
                                                                                                                                                                   temp_op->operator_formal_desc = strdup(X->operator_formal_desc);
                                                                                                                                                                                                temp_op->operator_impl_lang = strdup(X->operator_impl_lang);
temp_op->trigger_reqmts = id_list_copy(X->trigger_reqmts);
                       temp_op->output_guard_list = strdup(X->output_guard_list);
                                                                                                          temp_op->key_word_list = id_list_copy(X->key_word_list);
                                                      temp_op->exception_list = strdup(X->exception_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * Recovers all dynamic memory allocated to an OP_LIST.
                                                                                temp_op->timer_op_list = strdup(X->timer_op_list);
                                                                                                                                                                                                                                                       temp_op->is_terminator = X->is_terminator;
                                                                                                                                                                                                                             temp_op->is_composite = X->is_composite;
                                                                                                                                                                                                                                                                                                             temp_op->is_modified = X->is_modified;
                                                                                                                                                                                                                                                                                                                                          temp_op->is_deleted = X->is_deleted;
                                                                                                                                                                                                                                                                                   temp_op->is_new = X->is_new;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void op_list_release(OP_LIST X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * op_list_release(OP_LIST X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  * op_list_copy(OP_LIST X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free((char *) X->op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void op_list_release(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      op_release(X->op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            while (X != NULL) {
tempOP = X->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free((char *) X);
                                                                                                                                                                                                                                                                                                                                                                                                      return(temp_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OP_LIST tempOP;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 X = tempOP;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OP_LIST X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #else
                                                                                                                                                                                           4 910
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_op->period_reqmts = id_list_copy(X->period_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_op->met_requts = id_list_copy(X->met_requts);
temp_op->period = X->period;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_op->mrt_requts = id_list_copy(X->mrt_requts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op->mcp_reqmts = id_list_copy(X->mcp_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op->fw_unit = X->fw_unit;
temp_op->fw_requts = id_list_copy(X->fw_requts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op = (OPERATOR) malloc(sizeof(OP_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_op->label_x_offset = X->label_x_offset;
temp_op->label_y_offset = X->label_y_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op->met_x_offset:
temp_op->met_y_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_op->trigger_type = X->trigger_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op->timing_type = X->timing_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op->period_unit = X->period_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op->label_font = X->label_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_op->label = strdup(X->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_op->met_unit = X->met_unit;
temp_op->met_font = X->met_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op->mcp_unit = X->mcp_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_op->mrt_unit = X->mrt_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op->radius = X->radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_op_num = X->op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_op->color = X->color;
                                                                                                                                                                                                                                                                                                                                                                      OPERATOR op_copy(OPERATOR X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op->met = X->met;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_op->mrt = X->mrt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op->mcp = X->mcp;
                                                                                                                                                                   * Deep copy of an Operator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op->fw = X->fw;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op->id = X->id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_op^->x = X^->x;
                                                                                                        * op_copy(OPERATOR X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_op^-y = X^-y;
                                                                                                                                                                                                                       #ifdef _NO_PROTO OPERATOR op_copy(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                       OPERATOR temp_op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (X != NULL) {
                                                                                                                                                                                                                                                                                   OPERATOR X;
                                                                                                                                                                                                                                                                                                                                                                                                      #endif
                                                                                                                                                                                                                                                                                                                                            #6139
```

temp_op->trigger_set = id_list_copy(X->trigger_set); temp_op->if_condition = strdup(X->if_condition);

X->key_word_list = NULL;

```
* Recovers all dynamic memory allocated within a STREAM_NODE. STREAM_NODE*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      X->state_initial_value = NULL;
                                                                                                                                                                                                                                                               * Recovers all dynamic memory allocated to a SPLINE_PTR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      X->stream_type_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /* MTS 11/7/96 change NULL to EXTERNAL_VERTEX_NUM */
X->from = EXTERNAL_VERTEX_NUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  X->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * memory itself is not recovered.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(X->state_initial_value);
                                                                                                                                                                                                                                                                                                                                                                                                                 void arc_release(SPLINE_PTR X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(X->stream_type_name);
                                                                                                                                                                                                                 * arc_release(SPLINE_PTR X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void st_release(STREAM X) {
temp2 = temp2->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * st_release(STREAM X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         while (X != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tempSP = X->next;
free((char *) X);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SPLINE_PTR tempSP;
                                                                                                                                                                                                                                                                                                                               void arc_release(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free(X->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void st_release(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (X != NULL) {
                                                                                                       return(NULL);
                                                                                                                                                                                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         X = tempSP;
                                           return(x);
                                                                                                                                                                                                                                                                                                                                                     SPLINE_PTR X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          STREAM X;
                                                                                                                                                                                                                                                                                                                                                                                                                                         #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * 70
                                                                                                                                                                                                                                                                                                                                                                                                                                                               *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (y != NULL) {
   SPLINE_PTR x = (SPLINE_PTR) malloc(sizeof(SPLINE_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp1 is used to build the new SPLINE_PTR, temp2 is used to step through the original SPLINE_PTR.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp1->next = (SPLINE_PTR) malloc(sizeof(SPLINE_NUDE));
                                                                                                                                                                                                                                                               tempOP = (OP_LIST) malloc (sizeof(OP_LIST_NODE));
                                                                                                                                                                                                                                                                                   tempOP->op = op_copy(X->op);
tempOP->next = op_list_copy(X->next);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SPLINE_PTR arc_copy(SPLINE_PTR y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* y is the original SPLINE_PTR, x is the new SPLINE_PTR,
                                                                                 OP_LIST op_list_copy(OP_LIST X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (temp2->next != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * Deep copy of an SPLINE_PTR.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                while (temp2 != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SPLINE_PTR temp1, temp2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp1->x = temp2->x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp1-y = temp2-y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * arc_copy(SPLINE_PTR y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp1->nert = NULL;
OP_LIST op_list_copy(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp1 = temp1->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            x->next = NULL;
                                                                                                                                                                                                                                                                                                                                                       return(tempOP);
                                                                                                                                                                                             return(NULL);
                                                                                                                             OP_LIST tempOP;
                                                                                                                                                                       if (X == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp1 = x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp2 = y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SPLINE_PTR y;
                     OP_LIST X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Pendif
```

```
* Deep copy of an SI_LIST
                                                                                        * Driginal SI_LIST pointer is set to NULL on return.
*************************
                      47
                                                                                                                                                                                                                                                                                                                                                                                                         tempST = X->next;
/* MTS 11/7/96 change st_release(&(X->st)) to st_release(X->st) */
                                                                  * Recovers all dynamic memory allocated to an ST_LIST.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 tempST = (ST_LIST) malloc(sizeof(ST_LIST_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         tempST->st = st_copy(X->st);
tempST->next = st_list_copy(X->next);
                                                                                                                                                                                                                                                                woid st_list_release(ST_LIST X) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ST_LIST st_list_copy(ST_LIST X) {
                   * st_list_release(ST_LIST X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            * st_list_copy(ST_LIST X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free((char *) X->st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
ST_LIST st_list_copy(X)
                                                                                                                                                                 void st_list_release(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                            st_release(X->st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free((char *) X);
                                                                                                                                                                                                                                                                                                                                                                                     while (X != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return(tempST);
                                                                                                                                                                                                                                                                                                                                         ST_LIST tempST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ST_LIST tempST;
                                                                                                                                      #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (X == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   X = tempST;
                                                                                                                                                                                         ST_LIST X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ST_LIST X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       0186
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #endif
                                                                                                                                                                                                                                                                                         #endif
                                                                                                                                                                                                                                          #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #6188
                                                                                                                                                                                                                                                                  4 910
                                                                                                                                                                   temp_st->state_initial_value = strdup(X->state_initial_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_st->stream_type_name = strdup(X->stream_type_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_st->is_state_variable = X->is_state_variable;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_st->latency_x_offset = X->latency_x_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st->latency_y_offset = X->latency_y_offset;
                                            X->arc = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_st->label_y_offset = X->label_y_offset;
temp_st->from = X->from;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st->label_x_offset = X->label_x_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_st = (STREAM) malloc(sizeof(ST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_st->latency_unit = X->latency_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_st->latency_font = X->latency_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_st->is_modified = X->is_modified;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_st->label_font = X->label_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_st->is_delated = X->is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_st->label = strdup(X->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_st->arc = arc_copy(X->arc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_st->latency = X->latency;
= EXTERNAL_VERTEX_NUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st->is_new = X->is_new;
                                                                                                                                                                                                                                                                                                                                                                                                         STREAM st_copy(STREAM X) {
                                            arc_release(X->arc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_st->to = X->to;
                                                                                                                                                                                                                                          * Deep copy of a Stream
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_st->id = X->id;
                                                                                                                                                                                         * st_copy(STREAM X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return(temp_st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (X != NULL) {
                                                                                                                                                                                                                                                                                                                 STREAM st_copy(X)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  STREAM temp_st;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return(NULL);
                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
X->to
                                                                                                                                                                                                                                                                                                                                           STREAM X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    6186
                                                                    ^
```

```
* This routine returns a pointer to a string which contains the time
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char* time_with_units(int time, int unit) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * and units based on the input parameters.
                                                                                                                                                      free((char *) X->parent_op_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  sprintf(buffer, "%d sec", time);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  sprintf(buffer, "%d min", time);
                                                                                                                                                                               free((char *) X->cur_op_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sprintf(buffer, "%d us", time);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  sprintf(buffer, "%d ms", time);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    sprintf(buffer, "%d hr", time);
                                                                                                                                                                                                                                                                                                                                                                                                      * time_unit_str(int time, int unit)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char* time_with_units(time, unit)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (time == UNDEFINED_TIME)
                                                                                                                                                                                                    free((char *) X->msg);
ERROR_MSGS tempErr, X;
                                                                                                                                  tempErr = X->next;
                                         if (ErrPtr != NULL) {
                                                                                                           while (X != NULL) {
                                                                                                                                                                                                                         free((char *) X);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char buffer[100];
                                                                                                                                                                                                                                               X = tempErr;
                                                                X = *ErrPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      tifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  switch(unit) {
                                                                                                                                                                                                                                                                                           *ErrPtr = X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             case MINUTE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             case SECOND:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               case HOUR:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        break:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           case US:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             case MS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int time;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #0156
                                                                                                                                    # / 0
  x->graph_informal_desc = NULL;
                                                              * Recovers all dynamic memory allocated to a GRAPH_DESC_NODE.

* Original pointer to GRAPH_DESC_NODE is untouched. Only the memory

* allocated inside the GRAPH_DESC_NODE is recovered.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              id_list_release(x->avail_impl_langs); x->avail_impl_langs # NULL;
                                                                                                                                                                                                                                                                                                                                                                                                        x->current_op_name = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      .= NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         x->global_types = NULL;
                                                                                                                                                                                                                                                                                                                                                               = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                    = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  * Recovers all dynamic memory allocated to an ERROR_MSGS list. * Original ERROR_MSGS pointer is set to NULL on return.
                                                                                                                                                                                                                                                                                                                                                                                        x->parent_op_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               x->operator_list
                                                                                                                                                                                                                                                                                                                                                                 x->root_op_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        x->stream_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         x->output_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        x->cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                    x->input_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             x->timer_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void err_msgs_release(ERROR_MSGS *ErrPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               op_list_release(x->operator_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    err_msgs_release(ERROR_MSGS *ErrPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        st_list_release(x->stream_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                    st_list_release(x->input_list);
st_list_release(x->output_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               id_list_release(x->timer_list);
                                                                                                                                                                                                                                                                  wold graph_release(GRAPH_DESC x) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(x->graph_informal_desc);
                      * graph_release(GRAPH_DESC x)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void err_msgs_release(ErrPtr)
ERRUR_MSGS *ErrPtr;
                                                                                                                                                                                                                                                                                                                                                                                                             free(x->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                      free(x->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                               free(x->root_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(x->global_types);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(x->cur_op_spec);
                                                                                                                                                                               void graph_release(x)
                                                                                                                                                                                                                                                                                                                                          if (x != NULL) {
                                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
                                                                                                                                                                                                      GRAPH_DESC x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #endif
                                                                                                                                                                                                                                                    #else
```

```
= dup_str("");
= dup_str(DEFAULT_IMPL_LANG);
                                                                                                                                                                                                                     = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                           = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                  = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = UNPROTECTED;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     OpPtr->operator_informal_desc = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = NULL;
                                                                                                                                               void init_operator(OPERATOR OpPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OpPtr->operator_formal_desc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          OpPtr->operator_impl_lang
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               OpPtr->output_guard_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OpPtr->exception_list
                                                                       void init_operator(OpPtr)
                                                                                                                                                                                                                                                                                                                                                                          OpPtr->label_x_offset
                                                                                                                                                                                                                                                                                                                                                                                           OpPtr->label_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OpPtr->trigger_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OpPtr->period_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OpPtr->timer_op_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OpPtr->key_word_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OpPtr->met_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          OpPtr->met_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OpPtr->trigger_type OpPtr->trigger_set
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OpPtr->if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OpPtr->is_composite
                                                                                                                                                                                                    if (OpPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               OpPtr->period_unit
                                                                                                                                                                                                                                                                                                                                                                                                              OpPtr->timing_type
                                                                                                                                                                                                                                                                                                                                                     OpPtr->label_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OpPtr->met_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OpPtr->mrt_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OpPtr->mcp_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OpPtr->fw_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                   OpPtr->met_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OpPtr->met_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OpPtr->mrt_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OpPtr->mcp_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OpPtr->fu_unit
                                                                                                                                                                                                                                           OpPtr->op_num
                                                                                                                                                                                                                                                                                                OpPtr->radius
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OpPtr->period
                                                    #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                   OpPtr->color
                                                                                                                                                                                                                                                                                                                                    OpPtr->label
                                                                                          OPERATOR OPPtr:
                                                                                                                                                                                                                                                                                                                                                                                                                                OpPtr->met
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OpPtr->mrt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OpPtr->mcp
                                                                                                                                                                                                                         OpPtr->id
                                                                                                                                                                                                                                                           OpPtr->x
                                                                                                                                                                                                                                                                               OpPtr->y
                                                                                                                                                                #endif
                                                                                                                              #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Given an OP_LIST and an ID, this routine will search the OP_LIST for
the first OPERATOR with a matching ID and return a pointer to that
OPERATOR. If a matching ID cannot be found in OP_LIST, NULL is
                                                                                                                                                                                     63
                                   sprintf(buffer, "%d illegal unit", time);
                                                                                                                                                                                                                                                                                                                                                                                                                                OPERATOR operator_id_ptr(OP_LIST ptr, int id) {
                                                                                                                                                                              * operator_id_ptr(OP_LIST ptr, int id)
                                                                                                                                                                                                                                                                                                                                    OPERATOR operator_id_ptr(ptr, id)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char* dup_str(char* ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (ptr->op->id == id)
                                                                                       return dup_str(buffer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     while (ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return strdup(ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return strdup("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return ptr->op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      * dup_str(char* ptr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ptr = ptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char* dup_str(ptr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (ptr == NULL)
                                                                                                                                                                                                                                                                                                                 #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return NULL;
break;
                                                    break;
                                                                                                                                                                                                                                                                                                                                                     OP_LIST ptr;
                 default:
                                                                                                                                                                                                                                                                                 returned.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           char* ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          •1se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #else
```

```
void init_graph_desc(GRAPH_DESC gdPtr) {
void init_graph_desc(gdPtr)
GRAPH_DESC gdPtr;
                                                                                   #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #else
                                                                                                                                                                                                                                                                                                                                                                                    /* MTS 11/7/96 change NULL to EXTERNAL_VERTEX_NUM */
                                                                                                                                                                                                                                                                                                                                                                                                                      = EXTERNAL_VERTEX_NUM;
                                                                                                                                                                                                                                                                                                                                                                                                      = EXTERNAL_VERTEX_NUM
                                                                                                                                                                                                                                                                                                 = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                    = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = dup_str("");
= false;
= false;
= false;
= false;
                                                                                                                                                                                                                                                                                                                  = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = dup_str("");
                = false;
= false;
= false;
                                                                                                                                                                                                                        void init_stream(STREAM StPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StPtr->state_initial_value
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void init_action(ACTION act);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                StPtr->is_state_variable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            StPtr->latency_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             StPtr->latency_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StPtr->stream_type_name
                                                                                                                                                                                                                                                                                                                                 StPtr->label_font
StPtr->label_x_offset
StPtr->label_y_offset
   Opptr->is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           StPtr->latency_unit
                                                                                                                                                        void init_stream(StPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            StPtr->latency_font
                   OpPtr->is_new
OpPtr->is_modified
OpPtr->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StPtr->is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef _NO_PROTO
void init_action(act)
ACTION act;
                                                                                                                                                                                                                                                                               if (StPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              act->next_op = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   StPtr->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                         StPtr->latency
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                StPtr->is_new
                                                                                                                                        #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                  StPtr->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                      StPtr->from
                                                                                                                                                                                                                                                                                                                                                                                                                                         StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                       StPtr->to
                                                                                                                                                                                                                                                                                                    StPtr->id
                                                                                                                                                                           STREAM StPtr;
                                                                                                                                                                                                                                                #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tendif
                                                                                                                                                                                                               #6186
```

```
/* Determines whether the input string represents a valid number. */
                  = dup_str("");
= UNDEFINED_OPNUM;
                                                          = dup_str("");
= UNDEFINED_OPNUM;
                                                                                                    = dup_str("");
= UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                    = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     num_length = .strlen(num);
if(num_length > 0) {
  for(index = 0; index < num_length; index++) {
  if((num[index] != '\n') &&</pre>
                                                                                                                                                                                                                                                                                                                                                                                                            = NULL;
= dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str("");
                                                                                                                                                                                                                                                                                                            = false;
                                                                                                                                                                                                                          = NULL;
                                                                                                                                                                                                                                                                                                                                                 = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = NULL;
                                                                                                                                                                  = NULL;
                                                                                                                                                                                   = NULL;
                                                                                                                                                                                                                                                                                                                                                                      = NULL;
                                                                                                                                                                                                                                                                                       = MS;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN valid_num_string(char *num) {
                                                                                                                                                                                                                                                                                         gdPtr->cur_op_spec_met_unit
                                                                                                                                                                                                                                                                                                            gdPtr->cur_op_is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                    gdPtr->graph_informal_desc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BOOLEAN valid_num_string(num)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          gdPtr->avail_impl_langs
                                                                                                                                                                                                                                                                      gdPtr->cur_op_spec_met
                                                                                                     gdPtr->current_op_name
                                                                gdPtr->parent_op_name
                                                                                                                          gdPtr->current_op_num
                                                                                   gdPtr->parent_op_num
                                                                                                                                                                                                                                                                                                                                                   gdPtr->operator_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int index, num_length;
                        gdPtr->root_op_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gdPtr->global_types
                                                                                                                                                                                                                                                                                                                                                                          gdPtr->stream_list
if (gdPtr != NULL) {
                                           gdPtr->root_op_num
                                                                                                                                                                                       gdPtr->output_list
                                                                                                                                                                                                                                gdPtr->cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                gdPtr->timer_list
                                                                                                                                                                    gdPtr->input_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(num != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char *num;
```

```
while (*idPtr != '\0') {
   if (!(isalnum(*idPtr) || (*idPtr == '_')))
   return false;
   idPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     * Verify that a string is a valid PSDL id.
                                                                                                                                                                                                    /* Get value of integer_literal */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BOOLEAN valid_id(char *id) {
                                                                                                                                                                                                                                                  *value = atoi(num);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (!isalpha(*idPtr))
                                         if (i == num_length)
                                                                    validated = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                         * valid_id(char *id)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #ifdef _NO_PROTO
BOOLEAN valid_id(id)
                                                                                                                                                                                                                                                                                                                                             return validated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return false;
                                                                                                                                                                                                                           if (validated)
                                                                                                                                                                                                                                                                                                *value = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 idPtr = id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              idPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char *id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ~
                                                                                                                                                                                                                                                                                                                                                                                                                                  ***********************
                                                                                                                                                                                                                                                                                                                    * Verify that a string (num) is a valid PSDL integer_literal, which has
                                                                                                                                                                                                                                                                         8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /* Check that there is only trailing whitespace remaining */
for (i = ix; ((i < num_length) & isspace(num[i])); i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          for (i = 0; ((i < num_length) && isspace(num[i])); i++)
                                                                                                                                                                                                                                                                                                                                                                                                              ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (ix < num_length) {
for (i = ix; ((i < num_length) & k isdigit(num[i])); i++)</pre>
                                                                                                                                                                                                                                                                                                                                           no sign. Leading and trailing whitespace is ignored.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BOOLEAN valid_integer_literal(char *num, int *value) {
(num[index] != '-') && (num[index] > '9')))
                                                                                                                                                                                                                                                                       * valid_integer_literal(char *num, int *value)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* Skip over any leading whitespace */
                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
BOOLEAN valid_integer_literal(num, value)
                                                                                                                                                                                                                                                                                                                                                                                         * integer_literal ::= digit {digit}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 num_length = strlen(num);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (num_length > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int i, ix, num_length;
                                             return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (ix == num_length)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (num != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      validated = true;
                                                                                         return true;
                                                                                                                                                         return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        îr = i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int *value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char *num;
                                                                                                                                                                                                                                                                                                                                                                                                                  * digit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ix = i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
```

```
if (!opID || *opID == '\O') /* If empty or NULL, it is not a valid op_id */
                                                                                                                                                                                                             /* assume it is validated until proved otherwise */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      tempOpId = (char *) malloc(strlen(opID)); /* area to remove whitespace */

    * Verify that a string is a valid PSDL op_id. If the opID has any
    * whitespace within the parenthesis, this whitespace will be removed from
    * opID when returned.

                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int state; /* uses above definitions to track location within op_id */
                                                                                            case OPID_INITIAL:
   if (((*OpIdPtr == '\tau')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int idLen; /* length of an id within the op_id */
                                                                                                                                                                   ::= letter {alpha_numeric}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN validated, process_next;
char *tempOpId, *OpIdPtr, *tempOpIdPtr;
                                                                                                                                                                                        alpha_numeric ::= letter | digit | _
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while (process_next && validated) {
                                                                                                                                                                                                                                                                                                                                                       BOOLEAN valid_op_id(char *opID) {
                                                                                                                                          ::= id {"," id}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #define OPID_OUTPUT_LIST_C 9
#define OPID_CLOSE 10
#define OPID_FINAL 11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = OPID_INITIAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #define OPID_INPUT_LIST
#define OPID_INPUT_LIST_C
#define OPID_OUTPUTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tempOpIdPtr = tempOpId;
validated = true;
                                                                                                                                                                                                                                                           BOOLEAN valid_op_id(opID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #define OPID_OUTPUT_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          process_next = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *tempOpIdPtr = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = opID;
                                                                                                                                                                                                                                                                                                                                                                                                                        #define OPID_INITIAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  switch (state) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #define OPID_OPNAME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #define OPID_PARAMS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          define OPID_FINAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return false;
                                                                                                                                                                                                                                    #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #define OPID_DOT
                                                                                                                                                                                                                                                                                                                                                                                                                                               #define OPID_ID
                                                                                                                       op_name
                                                                                                                                                                                                                                                                                    char *opID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OpldPtr
                                                                                                  op_id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      state
                                                                                                                                                                                                                                                                                                                                                                              tendif
                                                                                                                                                                                                                                                                                                                                  10150
                                                                                   *******************
                               014
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              013
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *
                                                                           * Pull out the valid part of an id, if no valid part, return false.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /* If empty or NULL, it is not a valid op_id
                                                                                                                                                                                                                                                                                  BUDIEAN parse_id(char *ID, int *idLen, BUDLEAN allow_types) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /* terminate string */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  cont_parsing = true;
while ((*idPtr != '\0') kk cont_parsing) {
   if (!(isalnum(*idPtr) || (*idPtr == '_')))
                                                                                                                                              BOOLEAN parse_id(ID, idLen, allow_types)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  key = is_keyword(tempID, allow_types);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      tempID = malloc((*idLen) + 1);
strncpy(tempID, ID, *idLen);
                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN cont_parsing, key;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *(tempID+(*idLen)) = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     cont_parsing = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                * valid_op_id(char *opID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *idLen = (idPtr - ID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (!isalpha(*idPtr))
                                                                                                                                                                                                                 BOOLEAN allow_types;
                                                                                                                                                                                                                                                                                                                                                       *tempID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (*ID == '\0')
                                                                                                                                                                                                                                                                                                                                                                              *idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free (tempID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   idPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return !key;
                                                                                                                                                                                                                                                                                                                                                                                                                                                 *idLen = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       idPtr = ID;
                                 * parse_id()
                                                                                                                                                                                              *idLen;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (!ID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             idPtr++;
                                                                                                                                                                         char *ID;
                                                                                                                                                                                                                                                                                                                                                           char
                                                                                                                                                                                                                                                                                                               #endif
```

```
/* already set invalid by parse_id, but just in case */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /* already set invalid by parse_id, but just in case */
                                                                                                                                                                                                                                                                                                                                                              += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tempOpIdPtr += idLen;
OpIdPtr += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                            else if (validated = parse_id(OpIdPtr, &idLen, false)) {
    strncat(tempOpIdPtr, OpIdPtr, idLen);
                                                                                    if (!((*OpldPtr == ' ') || (*OpldPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (!((*OpIdPtr == '') || (*OpIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (!((*0pIdPtr == ' ') || (*0pIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (validated = parse_id(OpIdPtr, &idLen, false)) {
   strncat(tempOpIdPtr, OpIdPtr, idLen);
                                                                                                                                                                                                                        /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *tempOpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *tempOpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (*OpIdPtr == '',') {
    state = OPID_INPUT_LIST_C;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  else if (*OpldPtr == '|') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             case OPID_INPUT_LIST_C:
                                                                                                                                                                                                                                                                                                                                                                                       state = OPID_INPUT_LIST;
                                                                                                                                                                 *tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          state = OPID_OUTPUTS;
*tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     state = OPID_INPUT_LIST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          case OPID_INPUT_LIST:
                                                                                                                                                                                                                     *tempOpldPtr = '\0';
                                                                                                                                                                                                                                                                                                                                   tempOpIdPtr += idLen;
                                                                                                                                        state = OPID_OUTPUTS;
                                                                                                               if (*OpIdPtr == '|') {
                                                           case OPID_PARAMS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          validated = false;
                                                                                                                                                                                            tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    tempOpIdPtr++;
       break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            break;
                                                                                                                                                                                                                                                                                                                                                         OpldPtr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               0180
                                                                             += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     tempOpIdPtr += idLen;
hhidbtr += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if ((((*OpIdPtr == '') || (*OpIdPtr == '\t,'))) {
if (validated = parse_id(OpIdPtr, &idLen, false)) {
    strncat(tempOpIdPtr, OpIdPtr, idLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (!((*OpidPtr == ' ') || (*OpidPtr == '\t'))) {
if (validated = parse_id(OpIdPtr, &idLen, false)) {
    strncat(tempOpIdPtr, OpIdPtr, idLen);
    tempOpIdPtr += idLen;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *tempOpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                              if (!((*OpIdPtr == ' ') || (*OpIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *tempOpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                                                             else if (*OpldPtr == '.') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *tempOpldPtr = *OpldPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (*OpidPtr == '(') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                    state = OPID_FINAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            state = OPID_OPNAME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  state = OPID_PARAMS;
                                                                                                                                                                                                                                                                                                                                                                                                                                         state = OPID_DUT;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              case OPID_OPNAME:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             state = OPID_FINAL;
                                                                                                                                                                                          validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   validated = false;
                                                                                                                                                                                                                                                                                                  case OPID_ID:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                       if (!(*OpldPtr))
                                                                                                          state = OPID_ID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case OPID_DOT:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!(*OpIdPtr))
                                                                                                                                                                                                                                                 break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       break;
```

```
*******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Verify that a string is a valid PSDL type_name. If the typeName has
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            any whitespace within the brackets, this whitespace will be removed
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ::= id | id "[" type_decl "]"
::= id_list ":" type_name {"," id_list ":" type_name}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               strcpy(opID, tempOpId); /* use op_id with whitespace removed */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *
                                              ise /* already set invalid by parse_id, but just in case */
validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /* no more input, do not loop any more
                                                                                                                                                                                                                               if (!((*OpIdPtr == ',') || (*OpIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* did we end correctly */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ::= letter {alpha_numeric}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * alpha_numeric ::= letter | digit |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         from the typeName when returned.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * valid_type_name(char *typeName)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ::= id {"," id}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN valid_type_name(typeName)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           process_next = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (state != OPID_FINAL)
state = OPID_OUTPUT_LIST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        validated = false;
                                                                                                                                                                                                                                                                                       state = OPID_FINAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!(*OpIdPtr))
                                                                                                                                                                                                         case OPID_CLOSE:
                                                                                                                                                                                                                                                                                                                                             validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free(tempOpId);
return validated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OpidPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (validated)
                                                                                                                                                                                                                                                               if (!(*OpldPtr))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char *typeName;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  type_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        type_decl
                                                                                                                                                          break;
                                                                                                                                                                                                                                                                                                                                                                                                                                 break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   id_list
                                                      e1se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* already set invalid by parse_id, but just in case */
                                                                                                                                                                                                                                                                                                                                                                                                                              += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      tempOpIdPtr += idLen;
OpIdPtr += (idLen - 1); /* will increment at the end */
                                                                                                                                                                                                                                                                                                                                                else if (validated = parse_id(OpIdPtr, &idLen, false)) {
                                                                                                                               case OPID_OUTPUTS:
   if (((*OpIdPtr == '\t'))) {
        if ('(*upIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (!((*UpIdPtr == '') || (*OpIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (!((**OpIdPtr == '') || (*OpIdPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (validated = parse_id(OpIdPtr, &idLen, false)) {
   strncat(tempOpIdPtr, OpIdPtr, idLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *tempOpidPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *tempUpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                          *tempOpIdPtr = '\0'; /* Need to end string */
                                                                                                                                                                                                                                                                                                                                                                           strncat(tempOpldPtr, OpldPtr, idLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (*OpIdPtr == ',') {
   state = OPID_OUTPUT_LIST_C;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case OPID_OUTPUT_LIST_C:
                                                                                                                                                                                                                                                                                                                                                                                                                                                       state = OPID_OUTPUT_LIST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else if (*OpldPtr == ')') {
                                                                                                                                                                                                                                         *tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     state = OPID_CLOSE;
*tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        case OPID_OUTPUT_LIST:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       *tempOpIdPtr = *OpIdPtr;
                                                                                                                                                                                                                                                                                                                                                                                                        tempOpIdPtr += idLen;
                                                                                                                                                                                   if (*OpldPtr == ')') {
                                                                                                                                                                                                              state = OPID_CLOSE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        validated = false;
    validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       validated = false;
                                                                                                                                                                                                                                                                 tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  tempOpIdPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        tempOpIdPtr++;
                                                                                   break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6186
```

015

```
locPtr += idLen;
srcPtr += (idLen -1); /* will increment at the bottom */
state = TYPE_NAME_VALID_ID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 srcPtr += (idLen -1); /* will increment at the bottom */
                                                    /* terminate string for now */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *locptr = '\0'; /* terminate string for now */
state = (*srcPtr == ',') ? TYPE_DECL : TYPE_NAME;
                                                                                                                                                                                                                                                                                                                                                                                          if (!(*srcptr == ' ') || (*srcptr == '\t')) {
if (validated = parse_id(srcPtr, &idLen, false)) {
    strncat(locPtr, srcPtr, idLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    case TYPE_DECL_VALID_ID:
   if (!((*srcPtr == '') || (*srcPtr == '\t'))) {
   if (*srcPtr == ',' || *srcPtr == ':') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (!((*srcPtr == ' ') || (*srcPtr == '\t'))) {
if (validated = parse_id(srcPtr, &idLen, true)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (!((*srcPtr == ' ') || (*srcPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (*srcPtr == ']' || *srcPtr == ',') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         strncat(locPtr, srcPtr, idLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              state = TYPE_DECL_VALID_ID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      case TYPE_NAME_VALID_ID:
                       locPtr++;
*locPtr = '\0';
state = TYPE_DECL;
*locPtr = *srcPtr;
                                                                                                                                                                   validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *locPtr = *srcPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *locPtr = *srcPtr;
                                                                                                                                                                                                                                                    validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      validated = false;
                                                                                                                                                                                                                                                                                                                                                                        case TYPE_DECL:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  case TYPE_NAME:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         locPtr += idLen;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  break;
                                                                                                                                                                                                                                                                                                              break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          locPtr++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    locPtr++;
                                                                                                                                                                                                                             61.56
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               locTypeName = malloc(strlen(typeName)); /* area to remove whitespace */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* assume validated until proven otherwise */ /* input to process */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* before we go any farther, make sure previous ID was not a type */
if (validated = (!is_keyword(typePtr, false))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (validated = parse_id(srcPtr, &idLen, true)) { /*check on types*/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         srcPtr += (idLen -1); /* will increment at the bottom */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /* for future test of type */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (!((*srcPtr == ' ') || (*srcPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (!((*srcPtr == ' ') || (*srcPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                        int state; /* one of the above defined states */
                                                                                                                                                                                                                                                                                                                                                                                                                                                          char *locTypeName, *srcPtr, *locPtr, *typePtr;
BOOLEAN valid_type_name(char *typeName) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* recursive type_decl */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            while (process_next && validated) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!typeName || *typeName == '\0')
                                                                                                                                                                                                                                                                                                                                                                                                BUOLEAN validated, process_next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    strncat(locPtr, srcPtr, idLen);
                                                                              /* Definition of states */
#define TYPE_INITIAL 0
#define TYPE_VALID_ID 1
                                                                                                                                                                                             #define TYPE_DECL_VALID_ID 3
                                                                                                                                                                                                                                                  #define TYPE_NAME_VALID_ID 6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else if (*srcPtr == '[') {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      state = TYPE_VALID_ID;
                                                                                                                                                                                                                                                                                    #define TYPE_NAME_CLUSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      srcPtr = typeName;
locPtr = locTypeName;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       state = TYPE_INITIAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              case TYPE_VALID_ID:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   case TYPE_INITIAL:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                validated = true;
process_next = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                state = TYPE_FINAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 typePtr = locPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      switch (state) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              locPtr += idLen;
                                                                                                                                                                                                                                                                                                              #define TYPE_FINAL
                                                                                                                                                                                                                          #define TYPE_NAME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  *locPtr = '\0';
                                                                                                                                                                   #define TYPE_DECL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (!(*srcPtr))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int level;
                                                                                                                                                                                                                                                                                                                                                                                                                                  int idLen;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               level = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       break;
                            #endif
```

```
^{*}/^{} make sure you update number of keywords ^{*}/^{}
/* Note that a slight improvement in performance can be made by stopping search when keywords are searched in alphabetical order. Make sure
                                                                                                                                                                                                                                                                         that keywords are inserted in alphabetical order
                                                                                                                                                      BUDLEAN is_keyword(char *id, BUDLEAN allow_types) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                static keyword_record keywords[] = {
                                                                                                                                                                                                                                                                                                  (use emacs <esc>-x sort-lines).
                    #ifdef _NO_PROTO
BOOLEAN is_keyword(id, allow_types)
                                                                                                                                                                                                                                                                                                                                                                   typedef struct keyword_record {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "IF", false,
"IMPLEMENTATION", false,
                                                                                                                                                                                                                                                                                                                       const int max_keys = 43;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     "DESCRIPTION", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "EXCEPTION", false, "EXCEPTIONS", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "INITIALLY", false, "INPUT", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "INTEGER", true, "KEYWORDS", false, "MICROSEC", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "DUTPUT", false,
"PERIOD", false,
"PROPERTY", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  "EXTERNAL", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   'OPERATOR", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "FALSE,", false, "GENERIC", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "EDGE", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     "AXIOMS", false,
                                                                                     BUOLEAN allow_types;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            "BOOLEAN", true,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     "GRAPH", false, "HOURS", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                        } keyword_record;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                "ABS", false,
"ALL", false,
"AND", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 "END", false,
                                                                                                                                                                                                                                                                                                                                                                                                         BOOLEAN type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              "MIN", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "MOD", false,
                                                                                                                                                                                                                                                                                                                                                                                            *iq:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        "MS", false, "NOT", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          'OR", false,
                                                                                                                                                                                 #endif
                                                                                                                                   #e]se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             strcpy(typeName, locTypeName); /* return copy with whitespace removed */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 612
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * Comparison is made case insensitive since the synthesiser generator. * matches both upper and lower case (even though mixed characters are
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /* no more input, do not loop any more
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    srcPtr--; /* decrement so that you can reprocess next char */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * Return true if id is a keyword as defined by sde.abstract.ssl
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * not caught by the SG, they are still considered keywords.
*locPtr = '\0';
state = (*srcPtr == ']') ? TYPE_NAME_CLOSE : TYPE_DECL;
} else if (*srcPtr == '[') { /* recursive type_decl */
                                                                                                                                                            /* terminate string for now */
                                                                                                                                                                                                                                                                                                                                          if (!((*srcPtr == ' ') || (*srcPtr == '\t'))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (state != TYPE_FINAL || level)
                                                                                                                                                                                                                                                                                                                                                                                                                                                           state = TYPE_NAME_VALID_ID;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          process_next = false;
                                                                                                                                                                                                                                                                                                                         case TYPE_NAME_CLOSE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * is_keyword(char *id)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                validated = false;
                                                                                                                                                                                                                                                                                                                                                                                          state = TYPE_FINAL;
                                                                                     state = TYPE_DECL;
*locPtr = *srcPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(locTypeName);
return validated;
                                                                                                                                                                                                                               validated = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (!(*srcPtr))
                                                                                                                                                                                                                                                                                                                                                                                                                   else if (level) {
                                                                                                                                                          *locPtr = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (validated)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        srcPtr++;
                                                                                                                                                                                                                                                                                                                                                                     if (!(*srcPtr))
                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     break;
                                                                                                                                       locPtr++;
                                                                         level++;
                                                                                                                                                                                                                                                                                                                                                                                                                                            level--;
                                                                                                                                                                                                          e1se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    e1se
```

```
* attr containing an empty string ("").
                                                                                                                                                                                                                                                                $10 *
                                                                                                                                                                                                                                          /*****************************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *
                                                                                                                                                                                                                                                                                                                                   * Builds and returns an AAT_LIST.

* Deep copy of an AT_LIST. The new AT_LIST may be modified in

* that any AT_NODE with an attr of NULL will be returned with an
for (i = 0; ((i < text_length) && isspace(text[i])); i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         x is the new AT_LIST, templ is used to build the new AT_LIST, temp2 is used to step through the original AT_LIST.
                                                                                                                                                                                                                                                                                                                * Based on id_list_copy written by Doug Lange 9/8/96.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AT_LIST x = (AT_LIST) malloc(sizeof(AT_NODE));
x->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp1->reqmts = id_list_copy(temp2->reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp1->next = (AT_LIST) malloc(sizeof(AT_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /* build the new list */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp1->attr = dup_str(temp2->attr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AT_LIST at_list_copy(AT_LIST y) {
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (temp2->next != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* y is the original AT_LIST,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   while (temp2 != NULL) {
                                                                                                                                                                                                                                                                * at_list_copy(AT_LIST y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp2 = temp2->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp1->next = NULL;
                                                                                           validated = false;
                                                                      if (i < text_length)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AT_LIST temp1, temp2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                MT_LIST at_list_copy(y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp1 = temp1->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (y != NULL) {
                                                                                                                                            return validated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                       tifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp1 = x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return(x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AT_LIST y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * Check to see if text is white space. White space has been expanded to * include a NULL pointer as well as space, tabs, etc.
                                                                                                                                                                                                                                                                                                                                                                                                     while (( i < max_keys) &&
   ((compare = strcssecmp(id, keywords[i].id)) > 0) )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (allow_types && keywords[i].type)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN white_space(char *text) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           text_length = strlen(text);
                   "SEC", false,
"SOME", false,
"SPECIFICATION", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN validated = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * white_space(char *text)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef _NO_PROTO
BOOLEAN white_space(text)
                                                                                                                                         "TRIGGERED", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (text != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int i, text_length;
                                                                                              "STATES", false,
                                                                                                                                                                                                               "VERTEX", false,
                                                                                                                    "TIMER", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (compare == 0)
                                                                                                                                                                    "TRUE", false,
                                                                                                                                                                                          "TYPE", false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return false;
                                                                                                                                                                                                                                            "XOR", false
                                                                                                                                                                                                                                                                                                                  int compare;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char *text;
                                                                                                                                                                                                                                                                                                                                                                                 i = 0;
```

void at_list_replace(AT_LIST *x, AT_LIST y) {

#endif

4

```
int set_operator_values(OPERATOR OpPtr, char *in, char *key,
                                                                                                                                                                                                                                                                                                                                     int read_operator(GRAPH_DESC_NODE *gdn, FILE *fp);
int read_stream(ST_LIST *StOut, OP_LIST OpPtr, FILE *fp);
int read_timer(GRAPH_DESC_NODE *gdn, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OPERATOR operator_ptr(char *ID_str, GRAPH_DESC_NODE *gdn);
                                                                                                                                                                                                                                                                                     int set_stream_values(STREAM StPtr, char *in, char *key,
                                                                                                                                                                                                                                                                                                                                                                                                                     int read_impl_langs(GRAPH_DESC_NODE *gdn, FILE *fp);
                                                                                                                                                                                void write_gdn_file(GRAPH_DESC_NODE *gdn, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void fprint_SPLINE_LIST(SPLINE_PTR spPtr, FILE *fp);
void fprint_OPERATOR_LIST(OP_LIST opPtr, FILE *fp);
void fprint_STREAM_LIST(ST_LIST stPtr, FILE *fp);
                                                                                                                                                                                                        int read_gdn_file(GRAPH_DESC gdnPtr, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int read_quote(char *in, char **out, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       woid fprint_ID_LIST(ID_LIST id, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void print_SPLINE_LIST(SPLINE_PTR spPtr);
void print_OPERATOR_LIST(OP_LIST opptr);
                                                                                                                                                                                                                                  void display_gdn(GRAPH_DESC_NUDE *gdn);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void print_STREAM_LIST(ST_LIST stPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void summarize_ID_LIST(ID_LIST idPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void read_line(char *in, char **out);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    SPLINE_PTR read_SPLINES(FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void print_summary(GRAPH_DESC gd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int encode_timing(char *value);
int encode_trigger(char *value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void print_ID_LIST(ID_LIST id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ID_LIST read_ID_LIST(FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *value, FILE *fp,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           int encode_time(char *units);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int encode_TF(char *value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char *value, FILE *fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OP_LIST OpPtr);
                                                  int encode_trigger();
int encode_IF();
int encode_timing();
                                                                          int encode_time();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef __cplusplus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #endif
                                                                                                                               #else
    ge_utilities_debug.h
                                                                                                                          #ifndef GE_UTILITIES_DEBUG_H
#define GE_UTILITIES_DEBUG_H 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      woid fprint_OPERATOR_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void print_OPERATOR_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             set_operator_values();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      woid fprint_SPLINE_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              woid fprint_STREAM_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SPLINE_PTR read_SPLINES();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void print_summary();
void summarize_ID_LIST();
                                                                                                                                                                                                                                  #include "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void print_SPLINE_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void print_STREAM_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     set_stream_values();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OPERATOR operator_ptr();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   read_impl_langs();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ID_LIST read_ID_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void fprint_ID_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void write_gdn_file();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   woid print_ID_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    read_operator();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int read_gdn_file();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void display_gdn();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 read_stream();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           read_timer();
                                                                                                                                                                                                            #include <stdio.h>
                                                                                                                                                                                                                                                                                                                  #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int read_quote();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void read_line();
                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                       #endif
                                                       Name:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int
```

} #endif #endif

```
/******************************
                                                                                                                                                                                                                                                                                                                                                                    (gdn->timer_list) fprint_ID_LIST(gdn->timer_list, fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int read_gdn_file(GRAPH_DESC gdnPtr, FILE *fp) {
                                                           fprint_OPERATOR_LIST(gdn->operator_list, fp);
                                                                                                                                                                            (gdn->stream_list); "": "NULL");
fprint_STREAM_LIST(gdn->stream_list, fp);
fprintf(fp," #STREAM_LIST_END\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   fprint_STREAM_LIST(gdn->output_list, fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             fprint_STREAM_LIST(gdn->input_list, fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fprintf(fp," #IMPL_LANG_LIST_END\n");
fprintf(fp,"\n #OPERATOR_LIST\t%s\n",
                                                                                          fprintf(fp," #OPERATOR_LIST_END\n");
                               (gdn->operator_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           fprintf(fp,"\n #OUTPUT_LIST\t%s\n",
                                                                                                                                                   fprintf(fp,"\n #STREAM_LIST\t%s\n",
                                                                                                                                                                                                                                                                                                            fprintf(fp,"\n #TIMER_LIST\t%s\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     fprintf(fp,"\n #INPUT_LIST\t%s\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          fprintf(fp," #STREAM_LIST_END\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   fprintf(fp," #STREAM_LIST_END\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (gdn->output_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                    fprintf(fp," #TIMER_LIST_END\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (gdn->input_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                        (gdn->timer_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 fprintf(fp,"\n#GRAPH_END\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int read_gdn_file(gdnPtr, fp)
GRAPH_DESC gdnPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          init_graph_desc(gdnPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              graph_release(gdnPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char param[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char key[MAX_LINE]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #6156
                                                                                                                                                                                                                                                                                                                                                                                                                                      gdn->graph_informal_desc) ? gdn->graph_informal_desc : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           fprintf(fp," op_spec_met:\t\t%d\n",gdn->cur_op_spec_met);
fprintf(fp," op_spec_met_units:\t%s\n",
time_units[(gdn->cur_op_is_pec_met_unit)+1];
fprintf(fp," cur_op_is_terminator:\t%s\n",
(gdn->cur_op_is_terminator:\t%s\n",
then.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        fprintf(fp," current_op_num:\t%d\n",gdn->current_op_num);
fprintf(fp," graph_informal_desc:\t\"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           fprintf(fp," parent_op_num:\t%d\n",gdn->parent_op_num);
fprintf(fp," current_op_name:\t\"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     fprintf(fp," root_op_name:\t\t\"/s\"\n",
(gdn->root_op_name) ? gdn->root_op_name : "");
fprintf(fp," root_op_num:\t\t/d\n",edn->root_op_num);
fprintf(fp," parent_op_name:\t\"/s\"/n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (gdn->current_op_name) ? gdn->current_op_name : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void write_gdn_file(GRAPH_DESC_NODE *gdn, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (gdn->parent_op_name) ? gdn->parent_op_name : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                fprintf(fp," global_types:\t\t\"%s\"\n",
gdn->global_types ? gdn->global_types : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              fprintf(fp,"#GRAPH_DESCRIPTION\n");
                                                           #include "ge_interface_labels.h"
                                                                                                                      #include "ge_utilities_debug.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /* cur_op_spec_states */
/* cur_op_spec_exceptions */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void write_gdn_file(gdn, fp)
GRAPH_DESC_NODE *gdn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /* cur_op_spec_generic */
/* cur_op_spec_input */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* cur_op_spec_output */
                                                                                       #include "ge_utilities.h"
                               #include "ge_interface.h"
                                                                                                                                                                                                                                           #define MAX_LINE 1000
  #include <string.h>
                                                                                                                                                                                  #define ERROR_CODE
                                                                                                                                                                                                              #define NO_ERROR 0
                                                                                                                                                                                                                                                                                                         #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #endif
                                                                                                                                                                                                                                                                                                                                                                             #endif
```

#include <stdlib.h>

#include <stdio.h>

```
void display_gdn(GRAPH_DESC_NODE *gdn) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             print_STREAM_LIST(gdn->stream_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            op_spec_met_units:\t%s\n"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (gdn->operator_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (gdn->stream_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (gdn->timer_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           printf("\n OPERATOR LIST: %s\n"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("GRAPH DESCRIPTION:\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf(" parent_op_name:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        printf("\n STREAM LIST:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf(" root_op_name:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  printf("\n TIMER LIST:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void display_gdn(gdn)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GRAPH_DESC_NODE *gdn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
                                                                                                                                                                           return NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf("
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         tendif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             error = read_stream(&gdnPtr->stream_list,gdnPtr->operator_list,fp);
                                                                              if (!ifgets(in,MAX_LINE,fp) || (sscanf(in,"%s",key)==EOF)) {
    print("ERROR. No data found.\n");
    return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                         while (fgets(in, MAX_LINE, fp) && (error == NO_ERROR)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    else if (stromp(key,"op_spec_met_units:") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           error = read_quote(in,&gdnPtr->graph_informal_desc,fp);
else if (strcmp(key,"global_types:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else if (strcmp(key, "graph_informal_desc:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else if (strcmp(key, "cur_op_is_terminator:")==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else if (strcmp(key,"current_op_num:") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   error = read_quote(in, &gdnPtr->current_op_name,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else if (strcmp(key,"parent_op_num:") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (strcmp(key,"current_op_name:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else if (strcmp(key, "parent_op_name:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         error = read_quote(in,&gdnPtr->parent_op_name,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            gdnPtr->cur_op_spec_met_unit = encode_time(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else if (stromp(key,"root_op_num:") == 0) {
sscanf(in,"%s%s", key, param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    else if (strcmp(key,"#OPERATOR_LIST") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     gdnPtr->cur_op_is_terminator = encode_TF(param);
                                                                                                                                                                                                                                                } while (strcmp(key,"#GRAPH_DESCRIPTION")!=0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else if (strcmp(key, "root_op_name:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  error = read_quote(in, &gdnPtr->root_op_name,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      error = read_quote(in,&gdnPtr->global_types,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else if (stromp(key,"op_spec_met:") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         else if (stromp(key,"#STREAM_LIST") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else if (stromp(key,"#TIMER_LIST") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (strcmp(key,"#INPUT_LIST") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                 (sscanf(in, "%s", key) != EOF) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     gdnPtr->cur_op_spec_met = atoi(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        sscanf(in, "/s/s", key, param);
gdnPtr->current_op_num = atoi(param);
/* Read file until start of data */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gdnPtr->parent_op_num = atoi(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              gdnPtr->root_op_num = atoi(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               error = read_operator(gdnPtr,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           sscanf(in, "%s%s", key, param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              sscanf(in, "%s%s", key, param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         error = read_timer(gdnPtr,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 sscanf(in, "%s%s", key, param)
                                                                                                                                                                                                                                                                                                                        error = NO_ERROR;
                                                                     *key = ' ;
                                                                                                                                                                                                                                                                                                                                                                                          *key = ' ':
```

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return ERROR_CODE; /* Something went wrong, pass on what we have */
                                                                                                                                                                                                                                                                                                                                                                             printf("WARNING: Problem was encountered while reading data.\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /**********************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (gdn->graph_informal_desc) ? gdn->graph_informal_desc : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  printf(" op_spec_met:\t\t%d\n",gdn->cur_op_spec_met);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (gdn->current_op_name) ? gdn->current_op_name : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (gdn->parent_op_name) ? gdn->parent_op_name : "");
printf(" current_op_name: \"%s\"\n",
                                                                              stror = read_stream(&gdnPtr->output_list,NULL,fp);
error = read_stream(&gdnPtr->input_list,NULL,fp);
else if (strcmp(key,"#OUTPUT_LIST") == 0)
                                                                                                                      else if (strcmp(key,"#IMPL_LANG_LIST") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (gdn->cur_op_is_terminator) ? "True" : "False");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (gdn->root_op_name) ? gdn->root_op_name : "");
printf(" parent_op_name: \"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        printf(" global_types:\t\t\"%s\"\n",
(gdn->global_types) ? gdn->global_types : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     time_units[[gdn->cur_op_spec_met_unit)+1]);
printf(" cur_op_is_terminator:\t%s\n",
                                                                                                                                                                 error = read_impl_langs(gdnPtr,fp);
else if (strcmp(key,"#GRAPH_END") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf(" graph_informal_desc: \"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            print_OPERATOR_LIST(gdn->operator_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           \"\s\"\n",
```

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Operator ID %d %s \n", opPtr->op->id, opPtr->op->label);
                                                                                                                                                                                               uhile (stPtr != NULL) {
   printf(" Stream ID %d %s : ", stPtr->st->id, stPtr->st->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                               printf(" graph_informal_desc: \"%s\"\n",
(gd->graph_informal_desc) ? gd->graph_informal_desc : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (gd->current_op_name) ? gd->current_op_name : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (gd->parent_op_name) ? gd->parent_op_name : "");
printf(" current_op_name: \"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    printf(" root_op_name: \"%s\"\n", (gd->root_op_name) ? gd->root_op_name : \", s\"\n", printf(" parent_op_name: \"%s\"\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void summarize_OPERATOR_LIST(OP_LIST opPtr) {
                                                                                                                                                void summarize_STREAM_LIST(ST_LIST stPtr) {
                                                                                                                                                                                                                                                                                summarize_SPLINE_LIST(stPtr->st->arc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void print_summary(GRAPH_DESC gd) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void summarize_OPERATOR_LIST(opPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("GRAPH DESCRIPTION:\n");
                                             void summarize_STREAM_LIST(stPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  while (opPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     opPtr = opPtr->next;
                                                                                                                                                                                                                                                                                                                                                              stPtr = stPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void print_summary(gd)
                                                                                                                                                                                                                                                                                                          printf("\n");
                          #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OP_LIST opPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 GRAPH_DESC gd;
                                                                       ST_LIST stPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   printf("
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #endif
                                                                                                                                                                               #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #6188
                                                                                                                             #0156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #0180
                                                                                                                                                                                                                                                                                                                                                                                                                                        /********************************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pxintf("\n IMPL_LANG_LIST\tks\n",
   (gdn->avail_impl_langs) ? "" : "NULL");
if (gdn->avail_impl_langs) print_ID_LIST(gdn->avail_impl_langs);
if (gdn->timer_list) print_ID_LIST(gdn->timer_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void summarize_SPLINE_LIST(SPLINE_PTR spPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf(" %d %d,", spPtr->x, spPtr->y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void summarize_ID_LIST(ID_LIST idPtr) {
                                                                                                                                                                                                         print_STREAM_LIST(gdn->output_list);
                                                                                                 print_STREAM_LIST(gdn->input_list);
                                                                                                                                                  printf("\n OUTPUT LIST: %s\n",
(gdn->output_list) ? "" : "NULL");
                                                                       (gdn->input_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void summarize_SPLINE_LIST(spPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      printf(" ID_LIST: ");
while (idPtr != NULL) {
   printf("%s, ", idPtr->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void summarize_ID_LIST(idPtr)
                                               printf("\n INPUT LIST:
                                                                                                                                                                                                                                                                                                                                                       printf("GRAPH END.\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while (spPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         idPtr = idPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        spPtr = spPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SPLINE_PTR spPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    printf("\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ID_LIST idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #0156
```

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/**********************************/
sscanf(in,"%s%s%1000c",key,start,rest);
if (new_line = strstr(rest,"\n")) /* Strip out newline */
*new_line = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                            int read_quote(char *in, char **out, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                While ((end_quote = strstr(in,"\"")) == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (end_quote = strstr(start_quote,"\"")) {
                                                                                                           out_str = dup_str(strcat(start,rest));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (fgets(in, MAX_LINE, fp) != 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (start_quote = strchr(in, '\"')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      out_str = dup_str(start_quote);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 strcpy(res_str,start_quote);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char *start_quote, *end_quote;
char value[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (fgets(in, MAX_LINE,fp) == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               out_str = dup_str(res_str);
                                                                                                                                                                                                                                                                               int read_quote(in, out, fp)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *res_str = result;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     result[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *end_quote = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *res_str = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               strcat(res_str,in);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *out = out_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              start_quote++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        strcat(res_str,in);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               *end_quote = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return ERROR_CODE;
                                                                                                                                    *out = out_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char *out_str;
                                                                                                                                                                                                                                                           #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              return NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *out = out_str;
                                                                                                                                                                                                                                                                                                                                       char **out;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else
                                                                                                                                                                                                                                                                                                              char *in;
                                                                                                                                                                                                                                                                                                                                                         FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char
                                                                                                                                                                                                                                                                                                                                                                                                                                                         #endif
                                                                                                                                                                                                                                                                                                                                                                                                          #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (gd->avail_impl_langs) summarize_ID_LIST(gd->avail_impl_langs);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (gd->timer_list) summarize_ID_LIST(gd->timer_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("\n OPERATOR LIST: %s\n",
gd->operator_list) ? "" : "NULL");
summarize_OPERATOR_LIST(gd->operator_list);
                                                                                                                                    printf(" global_types:\t\t\"%s\"\n",
(gd->global_types) ? gd->global_types : "");
                                                                                       (gd->cur_op_spec) ? gd->cur_op_spec : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  summarize_STREAM_LIST(gd->stream_list);
                                                                                                                                                                                                                                                                                                                                                                                    summarize_STREAM_LIST(gd->output_list);
                                                                                                                                                                                                                                                                                 summarize_STREAM_LIST(gd->input_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             printf("\n IMPL_LANG_LIST\t%s\n",
(gd->avail_impl_langs) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           value[MAX_LINE];
start[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void read_line(char *in, char **out) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             printf("\n TIMER LIST: %s\n",
(gd->timer_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                     printf("\n OUTPUT LIST: %s\n",
(ga->output_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               %s/n",
                                                              printf(" op_spec:\t\t\"%s\"\n",
                                                                                                                                                                                                                                    printf("\n INPUT LIST: %s\n",
(gd->input_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               printf("\n STREAM LIST: %s\n",
(gd->stream_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         printf("GRAPH END.\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void read_line(in, out)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char key[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *nev_line;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *out_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 char **out;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char *in;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char
```

```
return ERROR_CUDE; /* Something went wrong, did not find END key */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
                                                                                                                                                                                                                                                                                     /* Done with this operator, any more? */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int read_stream(ST_LIST *StOutP, OP_LIST OpPtr, FILE *fp) {
                                                               error = set_operator_values(OpPtr, in, key, value, fp);
if (fgets(in,MAX_LINE,fp) != 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /* Assumes that StOutP has already been released */
                                                                                                                                       scnCnt = sscanf(in, "%s%1000c", key, value);
                                                                                                                                                                                                                                                                                                                                   } while (repeat && (error == NO_ERROR));
                                                if (strcmp(key,"end_operator") !=0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int read_stream(StOutP, OpPtr, fp)
ST_LIST *StOutP;
OP_LIST OpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *key = ' '; *value = ' ';
                                                                                                                      *key = ' '; *value =
                                                                                                                                                                                                               error = ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ST_LIST StList, tail;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char value [MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char key[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            error = NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *StOutP = StOut;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          STREAM StPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ST_LIST StOut;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                             repeat = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int error;
int repeat;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          StOut = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int scnCnt;
repeat = 1;
do {
                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (key[0] == '#') { /* New list started, we have a problem */
                                                                                             while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
                                                                                                                                                                                                                                                                                     int read_operator(GRAPH_DESC_NODE *gdn, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (strcmp(key,"begin_operator")) {
    DpList = (OP_LIST) malloc(sizeof(OP_LIST_NODE));
    OpPtr = (OPERATOR) malloc(sizeof(OP_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      condit = sscanf(in,"%%1000c",key,value);
if (stromp(key,"#OPERATOR_LIST_END") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else { /* Read operators */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (gdn->operator_list == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              gdn->operator_list = OpList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  *key = ' '; *value = ' ';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           gdn->operator_list = NULL;
                                                                                                                                                               int read_operator(gdn, fp)
GRAPH_DESC_NUDE *gdn;
                                                                                                                                                                                                                                                                                                                                                           OP_LIST OpList, tail;
OPERATOR OpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               char value[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return NO_ERROR;
                     return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              tail->next = OpList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              init_operator(OpPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                           char key[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OpList->op = OpPtr;
OpList->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                   char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      error = NO_ERROR;
                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         tail = Oplist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         repeat;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int scnCnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int error;
                                                                                                                                                                                                               FILE *fp;
  6186
                                                                                                                                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                               #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int
```

```
else if (value[0] == '#') { /* New list started, we have a problem */ return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int read_impl_langs(GRAPH_DESC_NODE *gdn, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else { /* Add timer value onto list of timers */
                                                                                                                                                                                                                                                                                                                                                                                                     if ((strcmp(value,"#TIMER_LIST_END") == 0) ||
(strcmp(value;"end_id_list") == 0)) {
int read_timer(GRAPH_DESC_NODE *gdn, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                timer = (ID_LIST) malloc(sizeof(ID_NUDE));
                                                                                                                                                                                                                                                                                                                                                                             scnCnt = sscanf(in, "%s", value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int read_impl_langs(gdn, fp)
GRAPH_DESC_NODE *gdn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (gdn->timer_list == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     timer->id = dup_str(value);
timer->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gdn->timer_list = timer;
                                                                                                                                                                                                                                                          gdn->timer_list = NULL;
                                                                                                                                        char value [MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (scnCnt > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                  return NO_ERROR;
                                                                     ID_LIST timer, tail;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tail->next = timer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ID_LIST lang, tail;
                                                                                                              char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                            error = NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                         *value = ' ';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef _NO_PROTO
                                                                                                                                                                  int repeat;
                                                                                                                                                                                                               int scnCut;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    tail = timer;
                                                                                                                                                                                         error;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 FILE *fp;
                         #endif
                                                                                                                                                                                         int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #0150
                                                                                      else if (key[O] == '#') {    /* New list started, we have a problem */ return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       error = set_streem_values(StPtr, in, key, value, fp, OpPtr);
if (fgets(in,MAX_LINE_fp) != 0) {
   *key = ' '; *value = ' ';
                                                                                                                                                                                                             StList = (ST_LIST) malloc(sizaof(ST_LIST_NODE));
StPtr = (STREAM) malloc(sizaof(ST_NODE));
    scnCnt = sscanf(in,"%%1000c",key,value);
if (strcmp(key,"#STREAM_LIST_END") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       } while (repeat && (error == NO_ERROR));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sscanf(in, "%s%1000c", key, value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (strcmp(key, "end_stream") !=0) {
                                                                                                                                                                  else { /* Read streams */
if (scnCnt > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      error = ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int read_timer(gdn, fp)
GRAPH_DESC_NODE *gdn;
                                                   return NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                   tail->next = StList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Stlist->st = StPtr;
                                                                                                                                                                                                                                                                                                              if (StOut == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      StList->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                    = StList;
                                                                                                                                                                                                                                                               init_stream(StPtr);
                                                                                                                                                                                                                                                                                                                                                            *StOutP = StOut;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   repeat = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tail = StList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           repeat = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FILE *fp;
                                                                                                                                                                                                                                                                                                                                      StOut
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else
```

```
/************************
                                                                                                                                                                                                                                                                                                                                                                                  for (i = 0; i < 3; i++) {
   if (strcmp(value, trigger_conds[i])==0)
   return (i);</pre>
                                                                                                                                                                                                                                     for (i = 0; i < 6; i++) {
   if (strcmp(units,time_units[i])==0)
   return (i-1);</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int encode_trigger(char *value) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (strcmp(value, "True") == 0)
                                                                                                                                     int encode_time(char *units) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int encode_TF(char *value) { #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                           int encode_trigger(value)
                                                        int encode_time(units)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int encode_TF(value)
                                    #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 char *value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *value;
                                                                              char *units;
                                                                                                                                                                                                                                                                                                                       return -1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return 0;
                                                                                                                                                                                                  int i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int i;
                                                                                                                                                           #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #else
                                                                                                                     #6188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #else
                                                                                                                                                                                                                                                                                          else if (value[O] == '#') { /* New list started, we have a problem */ return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 error = NO_ERROR;
while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
    *value = ' ';
                                                                                                                                                                            scnCnt = sscanf(in, "%s", value);
if ((strcmp(value, "#IMPL_LANG_LIST_END") == 0) ||
(strcmp(value, "end.id_list") == 0)) {
    return NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                     lang = (ID_LIST) malloc(sizeof(ID_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (strcmp(value,timing_types[i])==0)
return (i);
                                                                                                                                                                                                                                                                                                                                                                                                                         if (gdn->avail_impl_langs == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int encode_timing(char *value) {
                                                                                                                                                                                                                                                                                                                                                                                                                                           gdn->avail_impl_langs = lang;
                                                                                                 gdn->avail_impl_langs = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          for (i = 0; i < 3; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                tail->next = lang;
lang->id = dup_str(value);
lang->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int encode_timing(value)
                                                                                                                                                                                                                                                                                                                                                                                  if (scnCnt > 0) {
char value[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return ERROR_CODE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef _NO_PROTO
                    int repeat;
                                                       int scnCnt;
                                        error
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char *value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tail = lang;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return 0;
                                                                                                                                                                                                                                                                                                                                                              else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
```

	StPtr->latency_y_offset = atoi(p
, 格勒特拉斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯斯	else if (stromp(key,lb_stream_type) error = read onote(value.&StPtr-
	else if (strcmp(kev,lb_state_initi
#ifdef _NO_PROTO	error = read_quote(value, &StPtr-
int set_stream_values(StPtr, in, key, value, fp, OpPtr)	else if (stromp(key,lb_is_state_va
STREAM StPtr;	StPtr->is_state_variable = encod
char *in;	else if (strcmp(key,lb_is_new)==0)
char *key;	StPtr->is_new = encode_TF(param)
char *value;	else if (strcmp(key,lb_is_modified
FILE *fp;	StPtr->is_modified = encode_TF(p
OP_LIST OpPtr;	else if (strcmp(key,lb_is_deleted)
•	StPtr->is_deleted = encode_TF(pa
##else	else if (strcmp(key,lb_arc)==0) {
int set_stream_values(STREAM StPtr, char *in, char *key,	if (strstr(value, "NULL") != NULL
char *value, FILE *fp,	StPtr->arc = NULL;
OP_LIST OpPtr) {	else
#endif	StPtr->arc = read_SPLINES(fp);
in order to set up	•
pointers for streams (from, to). */	return error;
char temp name [MAX LINE]:	
that tartam (Mar TINE)	*******
Char wheele in the bulletin	
	#ifdef _NO_PROTO
int error = NO_ERROR;	int set_operator_values(OpPtr, in, k
	OPERATOR OpPtr;
*param = ' ';	char *in;
sscanf(value, "%s", param);	char *key;
	char *value;
<pre>if (strcmp(key,lb_id)==0)</pre>	FILE *fp;
StPtr->id = atoi(param);	
else if (strcmp(key,lb_label)==0)	#e]se
error = read_quote(value, &StPtr->label,fp);	int set_operator_values(OPERATOR OpP
else if (strcmp(key,lb_label_font)==0)	char *value, FILE *fp) {
StPtr->label_font = atoi(param);	#endif
else if (strcmp(key,lb_label_x_offset)==0)	
StPtr->label_x_offset = atoi(param);	char temp_name[MAX_LINE];
else if (strcmp(key,lb_label_y_offset)==0)	char param[MAX_LINE];
StPtr->label_y_offset = atoi(param);	char *name = temp_name;
else if (stromp(key,lb_from)==0)	
StPtr->from = atoi(param);	int error = NU_ENNUK;
else if (stromp(key, Lb_to) == 0)	
Stptr->to = atoi(param);	*param * .
else if (stromp(key,lb_latency)==0)	sscant (value, "As", param);
StPtr->latency = atoi(param);	
else if (stromp(key,lb_latency_unit) == 0)	if (strcmp(key,lb_id)==0)
StPtr->latency_unit = encode_time(param);	OpPtr->id = atol(param);
else if (stromp(key,lb_latency_font) == 0)	else if (stromp(key,lb_op_num)==0)
StPtr->Latency_font = atoi(param);	UpPtr->op_num = ato1(param);
else if (stromp(key,lb_latency_r_offset)==0)	else ii (stromp(key,lb_r)==U)
StPtr->latency_x_offset = atoi(param);	UpPtr-X = atol(param);
else if (strcmp(key,lb_latency_y_offset)==0)	else if (stromp(key,lb_y)==0)

```
/***********************
po_namo) = 0
po_namo) == 0)
tial_valuo) == 0)
r->steteam_typo_namo,fp);
r->stetee initial_valuo,fp);
variable) == 0)
ode_IF(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                tr, char *in, char *key,
                                                                                                                                                                                                                                                                                                                                        ey, value, fp)
                                                                                                           );
d)==0)
param);
)==0)
aram);
```

```
error = read_quote(in,&OpPtr->output_guard_list,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 error = read_quote(in, &OpPtr->exception_list,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      error = read_quote(in,&Opptr>timer_op_list,fp);
else if (strcmp(key,lb_key_word_list)==0)
if (strstr(value,"NULL") != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DpPtr->trigger_set = read_ID_LIST(fp);
else if (strcmp(key,lb_if_condition)==0)
error = read_quote(in,&OpPtr->if_condition,fp);
                                                                                                                                                                                                                                                                                                                                                                                                    OpPtr->trigger_type = encode_trigger(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Opptr->is_deleted = encode_TF(param);
else if (strcmp(key,lb_operator_impl_lang)==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OpPtr->trigger_reqmts = read_ID_LIST(fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (strcmp(key,lb_output_guard_list)==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OpPtr->key_word_list = read_ID_LIST(fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else if (strcmp(key,lb_trigger_requts)==0)
if (strstr(value,"NULL") != NULL)
OpPtr->trigger_requts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            else if (strcmp(key,lb_exception_list)==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OpPtr->is_terminator = encode_TF(param);
                                                     Opptr->mrt_requts = read_ID_LIST(fp);
else if (strcmp(key,lb_mcp)==0)
OpPtr->mcp = atoi(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else if (strcmp(key,lb_timer_op_list)==0)
                                                                                                                                                                                                                                                                                                                                    OpPtr->mcp_reqmts = read_ID_LIST(fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          OpPtr->is_modified = encode_TF(param);
                                                                                                                                                                                                                                                                                                                                                                   else if (strcmp(key,lb_trigger_type)==0)
                                                                                                                                                                                 OpPtr->mcp_unit = encode_time(param);
                                                                                                                                                                                                                                                                                                                                                                                                                              else if (strcmp(key,lb_trigger_set)==0)
if (strstr(value,"NULL") != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else if (strcmp(key,lb_is_modified)==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else if (strcmp(key,lb_is_deleted)==0)
                                                                                                                                                                                                             else if (strcmp(key,lb_mcp_reqmts)==0)
if (strstr(value,"NULL") != NULL)
                                                                                                                                                  else if (strcmp(key,lb_mcp_unit)==0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Opptr->is_new = encode_IF(param);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             else if (strcmp(key,lb_is_new) == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OpPtr->key_word_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OpPtr->trigger_set = NULL;
OpPtr->mrt_reqmts = NULL;
                                                                                                                                                                                                                                                                              OpPtr->mcp_reqmts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else
```

if (strstr(value, "NULL") != NULL)

```
void fprint_ID_LIST(ID_LIST idPtr, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char x_str[MAX_LINE],y_str[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   while (idPtr != NULL) {
    fprintf(fp,"\t\t\%\n", idPtr->id);
    idPtr = idPtr->next;
                                                                                  void print_ID_LIST(ID_LIST idPtr) {
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SPLINE_PTR read_SPLINES(FILE *fp) {
                                                                                                                                           while (idPtr != NULL) {
  printf("\t\t\s\n", idPtr->id);
  idPtr = idPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fprintf(fp,"\tend_id_list\n");
                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
void fprint_ID_LIST(idPtr, fp)
ID_LIST idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    SPLINE_PTR head, tail, node;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #ifdef _NO_PROTO
SPLINE_PTR read_SPLINES(fp)
void print_ID_LIST(idPtr)
ID_LIST idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char value[MAX_LINE];
char label[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char in[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int repeat;
int error;
int scnCnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      head = NULL;
                                                                                                                                                                                                                                                                                                                                                                 FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                  #else
                                                                                                                                                                                                                                                                                                                                                                                                          #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *endif
                                                                                                       while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
         error = read_quote(value,&OpPtr->operator_impl_lang,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (strcmp(value,"end_id_list") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    else { /* Add value onto list */
   if (scnCnt > 0) {
    node = (ID_LIST) malloc(sizeof(ID_NODE));
   if (head == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    printf("Error in reading ID_LIST.\n");
return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        scnCnt = sscanf(in, "%s", value);
                                                                                                                                                                                                                                                 ID_LIST read_ID_LIST(FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* An error has occured */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         tail->next = node;
node->id = dup_str(value);
node->next = NULL;
tail = node;
                                                                                                                                                                                                                                                                                                              ID_LIST head, tail, node;
                                                                                                                                               #ifdef _NO_PROTO
ID_LIST read_ID_LIST(fp)
                                                                                                                                                                                                                                                                                                                                                  char in[MAX_LINE];
char value[MAX_LINE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 error = NO_ERROR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return head;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *value = ' ';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef _NO_PROTO
                                                     return error;
                                                                                                                                                                                                                                                                                                                                                                                             int repeat;
                                                                                                                                                                                                                                                                                                                                                                                                                                   int scnCnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      head = node;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        head = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                   error
                                                                                                                                                                                          FILE *fp;
                                                                                                                                                                                                                                                                         #endif
                                                                                                                                                                                                                                #6188
```

```
fprintf(fp,"\t\tx %d\ty %d\n", spPtr->x, spPtr->y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (opPtr->op->label) ? opPtr->op->label : "");
printf("\t%s\t\t%d\n",lb_label_font,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         printf("\t%s\t\t%d\n",lb_label_x_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf("\t%s\t\t%d\n",lb_label_y_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                printf("\t%s\t\t%d\n",lb_met_x_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("\t%s\t\t%d\n",lb_met_y_offset,
                                                                                                                                                                                                                                                                                                                                                        void print_OPERATOR_LIST(OP_LIST opPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         printf("\t%s\t\t\t\"\s\",1b_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      opPtr->op->label_y_offset);
printf("\t%s\t\t%s\n",lb_timing_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         timing_types[opPtr->op->timing_type]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf("\t%\t\t%\n",1b_met_unit,
time_units[opPtr->op->met_unit+1]);
printf("\t%\t\t%\n",1b_met_font,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf("\t%s\t\t\t%d\n",lb_op_num,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        printf("\t%s\t\t\t%d\n", lb_radius,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    printf("\t%s\t\t\t\d\n",lb_color,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                printf("\t%s\t\t\t%d\n",lb_met,
                                                                                                                                                                                                                                                                                                                                                                                                                                    printf("\t%s\t\t\t%d\n",lb_id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      printf("\t%a\t\t\t%d\n",1b_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("\t%s\t\t\t%d\n",1b_y,
                                                                                                 fprintf(fp,"\tend_splines\n");
                                                                                                                                                                                                                                                    void print_OPERATOR_LIST(opPtr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     opPtr->op->label_x_offset);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            opPtr->op->met_r_offset);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               opPtr->op->met_y_offset);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               opPtr->op->label_font);
while (spPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                           while (opPtr != NULL) {
                                                   spPtr = spPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              opPtr->op->met_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 opPtr->op->radius);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 opPtr->op->op_num);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                opPtr->op->color);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            opPtr->op->met);
                                                                                                                                                                                                                                                                                                                                                                                                                                                              opPtr->op->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   opPtr->op->y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  opPtr->op->x);
                                                                                                                                                                                                                               #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                           OP_LIST opPtr;
                                                                                                                                                                                                                                                                                                                                #else
                                                                                                                                                                                                                                                                                                                                                                                    #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 while ((error == NO_ERROR) && (fgets(in,MAX_LINE,fp) != 0)) {
                                                                     scnCnt = sscanf(in, "%s%s%s", value, x_str, label, y_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void fprint_SPLINE_LIST(SPLINE_PTR spPtr, FILE *fp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        while (spPtr != NULL) {
   printf("\t\tr %d\ty %d\n", spPtr->x, spPtr->y);
                                                                                                                                                                                                                               node = (SPLINE_PTR) malloc(sizeof(SPLINE_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             printf("Error in reading SPLINE nodes.\n");
                                                                                                    if (strcmp(value, "end_splines") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void print_SPLINE_LIST(SPLINE_PTR spPtr) {
                                                                                                                                                                            else { /* Add value onto list */
if (scnCnt > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void fprint_SPLINE_LIST(spPtr, fp)
SPLINE_PTR spPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef _NO_PROTO
void print_SPLINE_LIST(spPtr)
SPLINE_PTR spPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* An error has occured */
                                                                                                                                                                                                                                                                                                                                                            node->x = atoi(x_str);
node->y = atoi(y_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             spPtr = spPtr->next;
                                                                                                                                                                                                                                                                                                                                   tail->next = node;
  error = NO_ERROR;
                                                                                                                             return head;
                                                                                                                                                                                                                                                                                                                                                                                                           node->next = NULL;
                                                     *value = ' ';
                                                                                                                                                                                                                                                        if (head == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                    head = node;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                       tail = node;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #6188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #else
```

printf("\t%s\t\t\t%\d\n".lb_period.	printf("\t%s\
opPtr->op-yeriod);	(opPtr->op->op
printf("\t%s\t\t%s\n",lb_period_unit,	opPtr->op->o
time_units[opPtr->op->period_unit+1]);	printf("\t%s\
printf("\t%s\t\t%s\n",lb_period_reqmts,	(opPtr->op->is
(opPtr->op->period_reqmts)? "": "NULL");	printf("\t%s\
<pre>if (opPtr->op->period_reqmts) print_ID_LIST(opPtr->op->period_reqmts);</pre>	(opPtr->op->is
printf("\t%s\t\t\d\n",1b_fw,	printf("\t%s\
opPtr->op->fw);	(opPtr->op->is
printf("\t%s\t\t\%\n",lb_fw_unit,	printf("\t%s\
time_units[opPtr->op->fw_unit+1]);	(opPtr->op->is
printf("\ths\t\ths\n",lb_fw_reqmts,	printf("\t%s\
(opPtr->op->fw_reqmts) ? "" : "NULL");	(opPtr->op->is
<pre>if (opPtr->op->fw_requts) print_ID_LIST(opPtr->op->fw_requts);</pre>	printf("\t%s\
printf("\t%s\t\t\d\n",1b_mrt,	(opPtr->op->op
opPtr->op->mrt);	printf("\n");
printf("\t%s\t\t%s\n",1b_mrt_unit,	
time_units[opPtr->op->mrt_unit+1]);	opPtr = opPtr
printf("\t%s\t\t%s\n",lb_mrt_reqmts,	~
(opPtr->op->mrt_requts) ? "" : "NULL");	~
<pre>if (opPtr->op->mrt_requts) print_ID_LIST(opPtr->op->mrt_requts);</pre>	
printf("\t%s\t\t\d\n",lb_mcp,	*****
opPtr-vop-vacp);	
printf("\t%s\t\t%\n",lb_mcp_unit,	#ifdef _NO_PROTO
time_units[opPtr->op->mcp_unit+1]);	void fprint_OPERA
printf("\t%s\t\t%s\n",lb_mcp_reqmts,	OP_LIST opPtr;
(opPtr->op->mcp_reqmts)? "": "NULL");	FILE *fp;
<pre>if (opPtr->op->mcp_requts) print_ID_LIST(opPtr->op->mcp_requts);</pre>	Ļ
printf("\t%a\t\t%a\n",lb_trigger_type,	#else
trigger_conds[opPtr->op->trigger_type]);	void fprint_OPERA
printf("\t/ks\t\t/ks\n",lb_trigger_set,	#endif
(opPtr->op->trigger_set) ? "" : "NULL");	
if (opPtr->op->trigger_set) print_ID_LIST(opPtr->op->trigger_set);	int first = 0;
printf("\t%s\t\t\"%s\"\n",lb_if_condition,	
(opPtr->op->if_condition) ? opPtr->op->if_condition : "");	while (opPtr !=
printf("\t%s\t\t%s\n",lb_trigger_requts,	if (first) fp
(opPtr->op->trigger_reqmts) ? "" : "NUL");	first = 1;
if (opPtr->op->trigger_reqmts) print_ID_LIST(opPtr->op->trigger_reqmts);	fprintf(fp, "
printf("\t/s\t\"/s\"\n",1b_output_guard_list,	fprintf(fp,"
(opPtr->op->output_guard_list) ?	opPtr->op->id
opptr->op-coutput_guard_list : "");	iprintf(fp,"
printf("\t%s\t\t\","s\","n", lb_exception_list,	opPtr->op->op
(asiTuoladea-doc-Jahdo)	iprinti (ip,
Oprtr->op->exception_list : ".);	Oprtr->op->I)
DITHER LOCAL AND A	Thrunca (ab)
Opportive the state optimized to the state of the state o	frint(fr "/
Op: 0 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	onder-year
print() of the constant the many more than the constant that the constant that the constant the constant that the constant the constant that the constant that the constant that the constant the constant that t	forintf(fo."\
if (opptr-)op->kev word list) print ID LIST(opptr-)op->kev word list);	opPtr->op->co
printf("\t%\t"\n".lb operator informal desc.	fprintf(fp."\
(opPtr->op->operator_informal_desc) ?	(opPtr->op->1
opPtr->op->operator_informal_desc : "");	fprintf(fp, "\

opPtr->op->label_fout); fprintf(fp,"\t%s\t\t%d\n",lb_label_x_offset, opPtr->op->label_x_offset);	<pre>fprintf(fp,"\t%s\t\t\"%s\"\n",lb_if_condition, (opPtr->op->if_condition) ? opPtr->op->if_condition : ""); fprintf(fp,"\t%s\t\t%s\t\t%n",lb_trigger_reqmts,</pre>
fprintf(fp,"\t%s\t\t%d\n",lb_label_y_offset,	(opptr->op->trigger_requts) ? "": "NULL");
opPtr->op->label_y_offset); fprintf(fp."\t%s\t\t%s\n".1b_timing_type.	<pre>ii (oprtr->op->trigger_reqmts) iprint_iu_iis(oprtr->op->trigger_reqmts, ip); fprintf(fp,"\t%s\t\"%s\"\n",lb_output_guard_list,</pre>
timing_types[opPtr~>op->timing_type]);	(opPtr->op->output_guard_list) ?
<pre>fprintf(fp,"\t%s\t\t\t%d\n",lb_met,</pre>	opPtr->op-toutput_guard_list : "");
opptr->op->met);	<pre>fprintf(fp,"\t/s\t\t\"/s\",\n",lb_exception_list,</pre>
Iprint(Ip, "\the forther of the transfer of th	(oprtr-/op-/exception_list : "");
<pre>fbrintf(fp."\t%s\t\t\%d\n".1b_met_font.</pre>	<pre>fprintf(fp,"\t%s\t\t\","\",1b_timer_op_list,</pre>
opPtr->op->met_font);	(opPtr->op->timer_op_list) ?
<pre>fprintf(fp,"\t%s\t\t%d\n",lb_met_x_offset,</pre>	opPtr->op->timer_op_list : "");
opPtr->op->met_x_offset);	<pre>fprintf(fp,"\t/\$\t\t/\$\n",lb_key_word_list,</pre>
Iprinti(ip,"\trastc\track",ib_met_y_oriset, opptr=>on-ymet v offset);	<pre>(opror=>op">reg_word_liss() : wold</pre>
tf(fp,"\t%s\t\t%s\n",lb_met_reqmts,	fprintf(fp, "\t%s\t\"%s\"\n", lb_operator_informal_desc,
(opPtr->op->met_requts) ? "" : "NULL");	(opPtr->op->operator_informal_desc) ?
<pre>if (opPtr->op->met_requts) iprint_ID_LIST(opPtr->op->met_requts, fp); </pre>	opPtr->op-tr->operator_informal_desc : ""); farintf(fm "\+%e\+\"/e\\""]h onerator formal desc
Ipitacitip, tonstrict, it is provided the provided to the prov	(opptr->op->operator_formal_desc) ?
fprintf(fp,"\t%s\n",lb_period_unit,	opPtr->op-varator_formal_desc : "");
units[opPtr->op->period_unit+1]);	,lb_is_composite,
<pre>fprintf(fp,"\t%s\t\t%s\n",1b_period_reqmts,</pre>	(opptr-vop-vis_composite) ? "True" : "False");
(opptr->op-yperiod_requis) ? "" : "NULL"); if (onDt>on-ymeriod_recmis) forth ID [IST(onDtr->on->meriod recmis, fo);	Iprinti(ip, "(t/s)(t/t/s/n", id_is_terminator, (onptr-)on-);
ii (opiu. 70p / poiioa iidamo) ipiumo iidamo iida (opiu. 70p / poiioa iida (opiu. 70p / poiioa iida (opiu. 70p	di."
opptr->op->fw);	(opptr->op->is_new) ? "True" : "False");
fprintf(fp,"\t%s\t\t\t%s\n",lb_fs_unit,	',lb_is_modified,
time_units[opPtr->op->fw_unit+1]);	(opPtr->op-11s_modified) ? "True" : "False");
fprintf(fp,"\t%s\t\t%s\n",1b_fw_reqmts,	<pre>fprintf(fp,"\t/ks\t\t/\ks\n",lb_is_deleted,</pre>
(Oprer-voy-via-reques) :	forintf(fo."\t%s\t\t\t\"\s\"\n".lb operator impl lang.
ii (opiot /op	(opptr->op->operator_impl_lang) ? opptr->op->operator_impl_lang : "");
opPtr->op->mrt);	<pre>fprintf(fp,"\tend_operator\n");</pre>
fprintf(fp,"\t%s\t\t%s\n",lb_mrt_unit,	- +
time_units[opFtr->op->mrc_unit+1]); fprintf(fp."\t%s\t\t%s\n".lb mrt requts.	object - object - Traffe - Toldo - Tol
(opPtr->op->mrt_reqmts) ? "" : "NULL");	
<pre>if (opPtr->op->mrt_reqmts) fprint_ID_LIST(opPtr->op->mrt_reqmts, fp);</pre>	
fprintf(fp,"\t%s\t\t\t%d\n",1b_mcp,	/ 法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法法
opPtr->op->mcp);	OLURG UN POPPE
Iprinel(Ip, \tage\c/cas\n ,in_mcp_unic,	void print STREAM LIST(stPtr)
<pre>fprintf(fp,"\t\%\t\t\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</pre>	ST_LIST stPtr;
(opPtr->op->mcp_reqmts) ? "" : "NULL");	مبه
<pre>if (opPtr->op->mcp_reqmts) fprint_ID_LIST(opPtr->op->mcp_reqmts, fp);</pre>	OSTOR STRUCK TO LEGAL TO THE STRUCK TO THE S
<pre>iprinti(ip, "\txs\t\txs\n", ib_trigger_type, trigger_cond.f.onDtr->on->trigger_type]);</pre>	Vold print_binEar_Libi(Si_Libi serer) \ #endif
I_comma_Cpr or /oP / verb6or_oppor.	while (stPtr != NULL) {
(opPtr->op->trigger_set) ? "" : "NULL");	printf("\t%s\t\t\t\d\n",lb_id,
if (onDir-lon-linear sat) forint ID LIST(onDir-lon-linear sat. fp):	stptr->st->id);

void fprint_STREAM_LIST(ST_LIST stPtr, FILE *fp) {
 #endif

int first = 0;

```
? "True" : "False");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (stPtr->st->is_state_variable) ? "True" : "False");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ? "True" : "False");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ? "True" : "False");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               fprintf(fp, "\t%s\t\"%s\"\n", lb_state_initial_value,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            stPtr->st->latency_v_offset);
fprintf(fp,"\t%\t\"%s\"\n",lb_stream_type_name,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        iprintf(fp,"\t%s\t%s\n",lb_is_state_variable,
                                                                                                                                                                                                                                                                                                                                              fprintf(fp,"\t%s\t\t%d\n",lb_label_x_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                 fprintf(fp,"\t%s\t\t%d\n",lb_label_y_offset,
                                                                                                                                                                                                                                           (stPtr->st->label) ? stPtr->st->label : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fprintf(fp, "\t%s\t%d\n", lb_latency_x_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         stPtr->st->latency_x_offset);
fprintf(fp,"\t/k\t/\d\n",lb_latency_y_offset,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             fprintf(fp,"\t%s\t\t%s\n",lb_latency_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fprintf(fp,"\t%s\t\t%d\n",lb_latency_font,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 fprintf(fp,"\t%s\t\t%s\n",lb_is_modified,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       time_units[(stPtr->st->latency_unit)+1]);
                                                                                                                                                                                                            fprintf(fp, "\t%s\t\t\t\"%s\"\n", 1b_label,
                                                                                                                                                                                                                                                                               fprintf(fp,"\t%s\t\t%d\n",lb_label_font,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    fprintf(fp, "\t%s\t\t%s\n", lb_is_deleted,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             fprintf(fp,"\t%s\t\t\t%d\n",lb_latency,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        stPtr->st->state_initial_value : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          print_SPLINE_LIST(stPtr->st->arc, fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf(fp,"\t%s\t\t\t%s\n",lb_is_new,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    fprintf(fp, "\t%s\t\t\t%d\n", 1b_from,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               stPtr->st->stream_type_name : "");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    fprintf(fp, "\t%s\t\t\t%s\n", 1b_arc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (stPtr->st->state_initial_value) ?
                                                                                                                                  fprintf(fp, "\t%s\t\t\t%d\n", 1b_id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       fprintf(fp, "\t%s\t\t\t%d\n", 1b_to,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (stPtr->st->arc) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (stPtr->st->stream_type_name) ?
                                                                                                  fprintf(fp, "\tbegin_stream\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          printf(fp, "\tend_stream\n");
                                   if (first) fprintf(fp,"\n");
                                                                                                                                                                                                                                                                                                                                                                                 stPtr->st->label_x_offset);
                                                                                                                                                                                                                                                                                                                                                                                                                                                 stPtr->st->label_y_offset);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (stPtr->st->is_new)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      stPtr->st->latency_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (stPtr->st->is_modified)
                                                                                                                                                                                                                                                                                                                  stPtr->st->label_font);
while (stPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    stPtr->st->latency);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           stPtr->st->from);
                                                                                                                                                                            stPtr->st->id):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 stPtr->st->to);
                                                                         first = 1:
```

stPtr = stPtr->next;

ndif

ifdef __cplusp

extern void init_id_server();
extern unsigned int get_unique_id();

#ifndef get_unique_id_h #define get_unique_id_h 1

#include <stdlib.h> #include <stdio.h>

#ifdef __cplusplus
extern "C" {
#endif

#ifdef __cplusplus
}
#endif

#endif

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```
printf("Unable to open the file unique_id.dat for write\n");
clearerr(id_file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf("Unable to open the file unique_id.dat\n");
clearerr(id_file);
                                                                                                                                                                            id_file = fopen("unique_id.dat", "w");
if (id_file != NULL) {
   temp_id = unique_id + 1;
   fprintf(id_file, "%d\n", temp_id);
   fclose(id_file);
                                                            id_file = fopen("unique_id.dat", "r");
if (id_file != NULL) {
   fscanf(id_file, "%d", &unique_id);
   fclose(id_file);
                     unsigned int temp_id, unique_id;
                                                                                                                                                                                                                                                                                                                                                                                        unique_id = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return(unique_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            unique_id = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef __cplusplus
FILE *id_file;
                                                                                                                                                                                                                                                                                                                    else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                           else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #endif
                                                                                                                                                                                                                                                                                                                if ((id_file = fopen("unique_id.dat", "r")) == NULL) {
  id_file = fopen("unique_id.dat", "r");
  if (id_file != NULL) {
    fprintf(id_file, "%d\n", 1);
  folose(id_file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                printf("Unable to open the file unique_id.dat\n");
clearerr(id_file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  fscanf(id_file, "%d", &unique_id);
fclose(id_file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       unsigned int get_unique_id() {
                                                                   #include "get_unique_id.h"
                                                                                                                                                                                                                                                                        unsigned int unique_id;
                                                                                                                                                                                                   void init_id_server() {
  FILE *id_file;
#include <stdlib.h>
                                                                                                             #ifdef __cplusplus
extern "C" {
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     unique_id = 1;
                       #include <stdio.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                           else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             else {
```

```
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```

#ifdef _NO_PROTO

```
/* climb widget tree until we get to the top. Return the Shell */
extern Widget GetTopShell();
#else
extern Widget GetTopShell(Widget w);
#endif /* _NO_PROTO */
#ifdef __cplusplus
} /* Close scope of 'extern "C"' declaration which encloses file. */
#endif /* GETTOPSHELL_H */
```

```
while (w && !XtIsWHShell(w))
w = XtParent(w);
                                                                                                                                                                                         #endif /* _NO_PROTO */
                                                                                                                                                  GetTopShell(Widget w)
                           GetTopShell(w)
Widget w;
                                                                                                                                                                                                                                                                             return V;
                                                                                         #else
/* Written by Dan Heller. Copyright 1991, D'Reilly && Associates.

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                                                                                                                                                                                                                                                                                                                                                                                                  /* climb widget tree until we get to the top. Return the Shell */
                                                                                                                                                                                                                                  #include "gettopshell.h"
                                                                                                                                                  #include <stdio.h>
#include <ctype.h>
#include <Xm/DialogS.h>
                                                                                                                                                                                                                                                                           #ifdef __cplusplus
extern "C" {
#endif
                                                                                                                                                                                                                                                                                                                                                           #ifdef _NO_PROTO
```

	1
graph_editor.h	<pre>static BOULEAN motif_initialized = false; // only do motif init once static PrintBuf PrintCmd;</pre>
Lange and Anunciado	static char *prev_status;
graph_editor	
	<pre>void help_cb(Widget w, XtPointer client_data, XtPointer call_data); void save_state(int);</pre>
	void update_status(char* status, BOOLEAN bell);
@1 96/10/01 Ken Moeller	void clear_status();
Upgraded calling arguments to reflect changes to requirements.	
	extern "C" {
96/10/11 Ken Moeller	int edit_graph(
Moved print command over to an XEvent using a global print	/* in out parameter */
	GRAPH_DESC current_graph,
/* ***********************************	/* out parameter */
#include "ge_interface.h"	ACTION next_action,
#include "windows.h"	
#include <im text.h=""></im>	/* in parameter */
	ERRUR_MSGS sde_error_msgs);
###findef GRAPH_EDITOR_H	
	#endif

****/	***************************************		Items removed or tests added while testing @3	hile testing 03.
Name:	graph_editor.C	9	96/10/04 Ken Moeller	
Author:			Removal of viewer code. This	This option is no longer supported.
Program: Date Mod	Program: graph_editor Date Modified: 21 Sen 92		Still need to investigate the	Still need to investigate the resources. So the job is not complete.
- Water	graph aditor (is the main program for the	96	96/10/06 Ken Moeller	
	บี	}	Change in how units are encoded.	d.
	parameters, it allows either viewing only or full			
	editing of a graph passed by the CAPS '93 syntax-	4	96/10/11 Ken Moeller	
	directed editor.		Moved print command over to an XEvent so that the window	1 XEvent so that the window
General	Ganara Commente:		can be refreshed before the screen is captured.	reen is captured.
		****	/ 	/* *********************
	The XmProcessTraversal function is called numerous			
	places in an attempt to keep the keyboard input focus	#includ	#include <fstream.h></fstream.h>	//Added by DL 8/19/96
	in the drawing window. This allows the editor to	#include	e <iostream.h></iostream.h>	//Added by DL 8/19/96
	respond to the delete and backspace key. This works	#include	e <stdlib.h></stdlib.h>	
	with varying degrees of success.	#include	o <stream.h></stream.h>	
		#include	<pre>(e <sys stat.h=""></sys></pre>	//Added by DHA 9/18/96
Credits:		#incluc	#include <sys types.h=""></sys>	//Added by DHA 9/18/96
	Berekati, Naba, X Window System Programming, SAMS,		3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
	1001	#1nclude		
		#include		
	Heller, Dan, Motif Programming Manual, O'Reilly and	#include		
	Associates, 1991.	#include		//Added by DL 8/19/96
		#include		
	Johnson, Eric, and Reichard, Kevin, X Window	#include		
	Applications Programming, MIS Press, 1989.	#include		
		#include		
	_	#include		
	and OSF/Motif, Prentice-Hall, 1992.	#include		
		#include		
Reengir	Reengineering:	#include		//Added by DL 8/19/96
	Modified by Doug Lange on 8/12/96	#include		ď
	Removed Property button and put in its place a Timers button	#include		//Added by DL 8/19/96
	Modified by Doug Lange on 8/16/96 - 8/20/96	#include		
	Added callback and dialog for Timer Tool button.	#include		
		#include		
	Added callback and dialog for Informal Description Tool button.	#include	<pre>.e <xm separator.h=""></xm></pre>	//Added by DHA 8/20/96
		#include	e <xm text.h=""></xm>	
History:		#incluc	#include <xm textf.h=""></xm>	
01	96/09/29 Ken Moeller	#incluc	#include <xm togglebg.h=""></xm>	
	Migration from Motif 1.2 to Motif 1.1.			
		//#inc]	//#include "ge_utilities_debug.h"	
05	96/10/01 Ken Moeller	#incluc	#include <stdio.h></stdio.h>	
	Upgraded calling arguments to reflect changes to requirements.		;	
		#incluc		//Added by DL 8/19/96
e •	96/10/03 Ken Moeller	#include		//Added by DHA 8/20/96
	Started to switch over to build_from_sde and write_to_sde.	#include		//Added by DL 8/16/96
	This is not yet complete.	#Include		//Added by DL 8/16/96
•	20/00/02 No. 10-013-0-	#include	*include "gettopshellin"	// Racea by DnA 6/19/90
*	Terrang man color los	*****	m: toatma-mdard a	

	// by Motif for parsing the command line options.
//Added for req.	715/96
. p.,	/12/96 Widget toplevel, main_w, menubar, rowcol, scrolled_win,
//Added for req.	/12/96 op_button, term_button, stream_button, select_button,
	96/
cond.h" //Added for req.	
	XtAppContext app;
#include "postpopup.h" //Added by DHA 8/20/96	Pixmap op_button_pixmap, term_button_pixmap, stream_button_pixmap,
	select_button_pixmap, spec_button_pixmap, informal_button_pixmap
t.h"	types_button_pixmap,
#include "stream object.h"	timers button bixmap:
#include "operator property menu.h"	XGCValues sections.
##include "stream property menn; b" //Added for req. 8. dbs 9/16/96	
	UNITED TRANSPORTED TO THE TRANSP
######################################	
******** States to select the selection of the selection	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	<pre></pre>
// MAXCOLORS is the number of colors defined to the editor.	CRATANOTION - draw (http://or.or)
// To add or subtract colors this value must be modified	Absolution of the Control of Cont
	VENTOR DE LA CONTROL DE LA CON
The state of the factor of the	COCLOUROCILY: GIRW (MCCILY) (N.
// changed size from (5	
#Geline Dollowillin od	ANOTIAD: Graw(tab)
#deline HELFSIZ 1000	unsigned long gc_mask;
// graph_editor has a number of global variables due to	<pre>// XEvent *print_event = (XEvent *) malloc(sizeof(XEvent)); // @7</pre>
// Motif's use of callback functions. Since these functions	XEvent *print_event;
// have fixed formal persmeter lists. global variables must	
// he used to nees some data between functions	extern int Global arcc.
	-
	ettern that **Grobal_argv;
// All drawing commands are executed on both drawing a and	
// drawing_area_pixmap. drawing_a is the visible canvas, while	
// drawing_area_pixmap provides a backup. When the canvas needs	***************************************
// to be redrawn, the drawing in drawing_area pixmap is merely	*** Added by Doug Lange 8/16/96.*/
// copied back onto the canvas.	SSC
	ID_LIST idp;
// colors[] is a list of predefined X colors. To use others,	
// consult an X reference giving allowable color names. Using	ACTION_NODE* next_action_ptr; // kbm
// the predefined colors allows the user to specify color	
// preferences in X resource text files.	<pre>GC std_graphics_context, dotted_context, erase_context;</pre>
	Dimension width, height;
<pre>// graphic_list is a GraphObjectList containing all the</pre>	Pixmap drawing_area_pixmap;
// visible operators and streams.	Widget drawing_a, current_op_name, current_op_met;
	Widget save_indicator, error_indicator, status_indicator;
// selected_object_ptr always points to the object selected	BOOLEAN state_stream = false, alt_selected = false, ctrl_selected = false
// (i. e. with handles around it) on the drawing canvas.	BUDLEAN ibar_mode = false; // added for req #6.1. dha
	BOULEAN label_edit_mode = false; // added for req #6.1.1. dha
// num_del_ops is the number of deleted operators, and	CLASS_DEF object_def = GRAPHOBJECT; // added for req #6.1. dha
// del op id is an array of identifiers for delated operators.	char* colors[] = {"Acusmarine", "Black", "Blue", "BlueViolet",

```
\<u>\</u>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          * save_state() -- Updates the save_indicator with the current indicated
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNshadowType, XmSHADOW_IN, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNshadowType, XmSHADOW_OUT, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNshadowType, XmSHADOW_IN, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNshadowType, XmSHADGW_OUT, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(error_indicator, XmNshadowType, XmSHADOW_OUT, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // XtVaSetValues(error_indicator, XmNlabelString, label, NULL);
// XtVaSetValues(error_indicator, XmNshadowType, XmSHADOW_OUT, NULL);
                                                                                                                                                                                            XmNshadowType, XmSHADOW_IN, NULL);
                                                                                                                                                                                                                                                            XmNshadowType, XmSHADOW_OUT, NULL);
                                                                                                                                                                                                                                                                                                                                                             XmNshadowType, XmSHADOW_IN, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                XmNshadowType, XmSHADOW_OUT, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(error_indicator, XmNlabelString, label, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if ((errors_present == NULL) || (!syntax_checked)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  label = XmStringCreateSimple("Check Syntax");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      label = XmStringCreateSimple("ERROR MSGS");
                              void select_state(TOOL_STATE new_state) {
                                                                                                                                                                                                                                                                                                                                  if (new_state == TERMINATOR_TOOL)
                                                                                                                                                              if (new_state == OPERATOR_TOOL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(stream_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(select_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(stream_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(select_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (new_state == SELECT_TOOL)
                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(term_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (new_state == STREAM_TOUL)
                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(term_button,
                                                                                                                                                                                               XtVaSetValues(op_button,
                                                                                                                                                                                                                                                            XtVaSetValues(op_button,
                                                                                                 tool_state = new_state;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmStringFree(label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void error_label() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * error_label() --
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmString label;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // updated save_state when you return
                                                                                                                                                                                                                                                                                                                                                                                                                                "MidnightBlue", "Navy", "Orange", "OrangeRed", "Orchid", "PaleGreen", "Pink", "Plum", "Red", "Salmon", "Sealreen", "Sienna", "SkyBlue",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DparatorDbject **op.being.updated = NULL; // Add for req. 7, dha StreamObject *st.being.updated = NULL; // Add for req. 8, dha
                                                                                           "DarkSlateBlue", "DarkSlateGrey",
"DarkTurquoise", "DimGrey", "Firebrick",
"ForestGreen", "Gold", "Goldenrod", "Grey",
"Green", "GreenYellow", "IndianRed", "Khaki",
                                                                                                                                                                                                                       "LightBlue", "LightGrey", "LightSteelBlue", "LimeGreen", "Magenta", "Maroon",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     {"viewer", "Viewer", XmRBoolean, sizeof (int),
XtOffsetOf(struct _resrcs,viewer), XmRImmediate, False),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "SlateBlue", "SpringGreen", "SteelBlue",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "Tan", "Thistle", "Turquoise", "Violet", "VioletRed", "Wheat", "White", "Yellow",
                                                                                                                                                                                                                                                                                                                                                                "MediumSlateBlue", "MediumSpringGreen",
"MediumTurquoise", "MediumVioletRed",
                           "CornflowerBlue", "Gyan", "DarkGreen", "DarkOliveGreen", "DarkOrchid",
                                                                                                                                                                                                                                                                                                "MediumAquamarine", "MediumBlue",
                                                                                                                                                                                                                                                                                                                                  "MediumOrchid", "MediumSeaGreen",
'Brown", "CadetBlue", "Coral",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *help_menu_files[] = {"psdl_grammar.hlp",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "exceptions.hlp",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "operators.hlp",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      {"-v", "viewer", XrmoptionNoArg, "True"},
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 unsigned long color_table[MAXCOLORS + 1];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "timers.hlp"};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GraphObject* selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "streams.hlp"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            StreamObject *st_being_updated = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN psdl_modified, syntax_checked;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static XrmOptionDescRec options[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   FOOL_STATE tool_state = SELECT_TOOL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "YellowGreen"};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          static XtResource resources[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int default_font = COURIERBOLD12;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP_ID del_op_id[MAXDELETEDOPS];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GraphObjectList graphic_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ERRUR_MSGS errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int default_color = WHITE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         save_performed;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Display *display_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int num_del_ops = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Window draw_window;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             struct _resrcs {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int viewer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             } Resrcs;
```

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******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              {"", "Abort changes made to graph?", "Yes", "No", "Cancel", BTN2};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      {"", "Save changes made to graph?", "Yes", "No", "Cancel", BTN1};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Default action if not modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   a black and white screen
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Executes menu options from the 'file' menu. This is
                                                                                                                                                                                                                                                                                                                                                                                                                                  called by either the menu callback function, if the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  pulldown menus are used, or by the draw() function,
                                                   for(i = 1; i <= MAXCOLORS; i++) {
   if (strcmp(colors[i - 1], "White") != 0)
   color_table[i] = BlackPixelOfScreen(screen);</pre>
                                                                                                                                                                               color_table[i] = WhitePixelOfScreen(screen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            action = AskUser(app, drawing_a, abort_script);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = SAVE_TO_DISK;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if the alt-key combinations are used.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = REVERT;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void handle_file_options(int item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    case 1: // Restore from Save
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Quest_Script save_script ==
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Quest_Script abort_script =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XFlush(display_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (psdl_modified)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               switch(action) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           switch(item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    case 0: // Save
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                action = YES:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       break;
                            else {
                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(save_indicator, XmNlabelString, label, NULL);
XtVaSetValues(save_indicator, XmNshadowType, XmSHADGW_OUT, NULL);
                                                                                                                                                                            XtVaSetValues(save_indicator, XmNlabelString, label, NULL);
XtVaSetValues(save_indicator, XmNshadovType, XmSHADOW_IN, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtvaSetValues(save_indicator, XmNlabelString, label, NULL);
XtvaSetValues(save_indicator, XmNshadowType, XmSHADGW_IN, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtVaSetValues(status_indicator, XmNvalue, status, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     printf ("Allocated unknown color: %s\n", colors[i-1]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(status_indicator, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Colormap color_map = DefaultColormapOfScreen(screen);
                                                                                                                                               label = XmStringCreateSimple("Save Not Required");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int i, screen_depth = DefaultDepthOfScreen(screen);
                                                                                                                                                                                                                                                                                                                                 label = XmStringCreateSimple("SAVE REQUIRED");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (!XAllocNamedColor(display_ptr, color_map,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void update_status(char *status, BOOLEAN bell) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void initialize_color_table(Screen *screen) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        colors[i - 1], &color, &unused))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        label = XmStringCreateSimple("");
                                                                                                                                                                                                                                                                                                          else if (state == SAVE_REQUIRED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for(i = 1; i <= MAXCOLORS; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          color_table[i] = color.pixel;
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // Initializes the color table.
                                                                                                                  if (state == NOT_MODIFIED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XBell(display_ptr,100);
void save_state(int state) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                               syntax_checked = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                        psdl_modified = true;
                                                                                                                                                                                                                                        psdl_modified = false:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (screen_depth > 1) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MColor color, unused;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmStringFree(label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void clear_status() {
                                                            XmString label;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  error_label();
```

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/********************************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            {"", "Abort changes made to graph?", "Yes", "No", "Cancel", BIN2};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                {"", "Save changes made to graph?", "Yes", "No", "Cancel", BTN1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(next_action_ptr->next_op);
next_action_ptr->next_op = graphic_list.current_op_name();
next_action_ptr->next_op_num = graphic_list.current_op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    nert_action_ptr->next_op = graphic_list.root_op_name();
next_action_ptr->next_op_num = graphic_list.root_op_num();
return_sde_flag = true;
                                                                                                                                                        Executes menu options from the 'psdl' menu. This is
                                                                                                                                                                                    called by either the menu callback function, if the
                                                                                                                                                                                                             pulldown menus are used, or by the draw() function, if the alt-key combinations are used.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = CHECK_SYNTAX;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = UPDATE_TREE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = true;
                                                                                                                                                                                                                                                                                                                           void handle_psdl_options(int item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(next_action_ptr~>next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Quest_Script save_script =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Quest_Script abort_script =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        case 0: // Syntax Check
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        case 1: // Go to Root
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XFlush(display_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                switch(item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                char *opName;
                                                                                                                                                                                                                                                                                                                                                                                     int action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           break;
                      break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      break:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // This is not the default save option, see save_script
                                                                                                                                                                                                                                                                                                                                                       XSendEvent(display_ptr, toplevel_window, True, 0, print_event);
                                                                                                    return_sde_flag = false; // Aborted operation, do nothing
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          next_action_ptr->next_op = graphic_list.root_op_name();
next_action_ptr->next_op_num = graphic_list.root_op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     next_action_ptr->next_op = graphic_list.root_op_name();
next_action_ptr->next_op_num = graphic_list.root_op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Default action if not modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   action = AskUser(app,drawing_a, save_script);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          next_action_ptr->option = SAVE_TO_DISK;
next_action_ptr->reinvoke = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = ABANDON;
= false;
                                                                                                                                                                                                                                                                                                AskPrint(app,drawing_a, &PrintCmd);
if (PrintCmd.answer == DK) {
= true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(next_action_ptr~>next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return_sde_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return_sde_flag = true;
break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (psdl_modified)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     switch(action) {
                                                                                                                                                                                                                                                                       case 2: // Print
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case 3: // Exit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             case CANCEL:
return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                action = NO;
                                                                             case NO:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 case NO:
                                                                                                                                                                                                                                                                                                                                                                                                                                            break;
                                                                                                                                                                                                                  break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  default:
                                                                                                                               break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          break;
```

```
selected_object_ptr->set_object_font(list_struct_ptr->item_position);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 selected_object_ptr->color(list_struct_ptr->item_position);
selected_object_ptr->draw(SOLID);
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // the list box displayed in the 'draw_options:Undelete Operator'
                                                                                                                                                                                                  // the list box displayed in the 'draw_options:Color' menu.
                                                                                                                                                                      This function is called when a selection is made from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             This function is called when a selection is made from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 This function is called when a selection is made from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // the list box displayed in the 'draw_options:Font' menu.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (selected_object_ptr->is_a() == UPERATURUBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             default_color = list_struct_ptr->item_position;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         default_font = list_struct_ptr->item_position;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            graphic_list.set_default_font(default_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     static void op_list_cb(Widget widget, XtPointer,
                                                                                                                                                                                                                                                                                                            XtPointer cb_struct_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtPointer cb_struct_ptr) {
                                                                                                                                                                                                                                                                       void color_list_cb(Widget widget, XtPointer,
                                                                                                                                                                                                                                                                                                                                                                              (XmListCallbackStruct *) cb_struct_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmListCallbackStruct *list_struct_ptr =
(XmListCallbackStruct *) cb_struct_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void font_list_cb(Widget widget, XtPointer,
                                                                                                                                                                                                                                                                                                                                            XmListCallbackStruct *list_struct_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   selected_object_ptr->draw(SOLID);
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     selected_object_ptr->erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    selected_object_ptr->erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtDestroyWidget(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtDestroyWidget(widget);
break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ((OperatorObject *) selected_object_ptr)->op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                next_action_ptr->next_op = graphic_list.parent_op_name();
next_action_ptr->next_op_num = graphic_list.parent_op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            warning(drawing_a, "Not allowed to decompose a Type Operator");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 "A Type Operator must be Atomic: rename or leave Atomic",
                                                                                                                                      (graphic_list.parent_op_num() == UNDEFINED_OPNUM) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (selected_object_ptr->is_a() == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             warning(drawing_a, "Please select an operator");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             warning (drawing_a, "Please select an operator");
                                                                                                                                                                  warning(drawing_a, "No parent node defined");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Is a type
                                                                                                                                                                                                                                                                                                                                               = UPDATE_TREE;
                                                                                                    // Check for error condition of no Parent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = UPDATE_TREE;
                                                                                                                                                                                                                                                                                                                                                                                    = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = opName;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    opName = selected_object_ptr->name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (selected_object_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                       free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (strchr(opName,'.') != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              next_action_ptr->next_op_num =
                                                                                                                                                                                                                                                                                                                                                                                 next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                               next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return_sde_flag = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           next_action_ptr->next_op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return_sde_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      next_action_ptr->reinvoke
                                  case 2: // Go to Parent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return_sde_flag = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            case 3: // Decompose
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     update_status(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free (opName);
                                                                                                                                                                                                                                              break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       0130
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         default:
```

```
XmCreateScrolledList(drawing_a, "Fonts", NULL, 0);
                                 XmStringCreateSimple(graphic_list.font_name(i + 1));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtMalloc((num_del_ops + 1) * sizeof(XmString *));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      for(i = 0; i < num_del_ops; i++)
    op_list[i] = XmStringGreateSimple(del_op_str[i]);
    op_list[num_del_ops] = XmStringGreateSimple("Gancel");</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       op_box = XmCreateScrolledList(drawing_a, "Undelete",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            graphic_list.get_del_op_list(del_op_str, del_op_id,
                                                                                                                                                                                                                                                                                                                                                                                                      XtAddCallback(list_box, XmNdefaultActionCallback,
font_list_cb, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Quest_Script abandon_script = {"","All changes will be lost, are you sure?",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   reply = AskUser(app, drawing_a, abandon_script);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtAddCallback(op_box, XmNdefaultActionCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNitems, op_list,
XmNitemCount, num_del_ops + 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             num_del_ops);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNvisibleItemCount, 7,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for(i = 0; i < num_del_ops + 1; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       selected_object_ptr->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                - ABANDON;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_list_cb, NULL);
                                                                                                                                                                                                                                                                                                                                      XmStringFree(font_list[i]);
XtFree((char *) font_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                 for(i = 0; i < MAXFONTS; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(op_list[i]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtFree((char *) op_list);
                                                                                                                                                                                                                                       XmNvisibleItemCount, 7,
                                                                                                                                                                                                      XmNitemCount, MAXFONTS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            op_list = (XmStringTable)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtManageChild(list_box);
                                                                                                                                      KtVaSetValues(list_box,
                                                                                                                                                                          XmNitems, font_list,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtManageChild(op_box);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                "Yes", "No", "Cancel", BTN1};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues (op_box,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (reply == YES) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      next_action_ptr->option
font_list[i] =
                                                                         list_box =
                                                                                                                                                                                                                                                                      del_op_id[list_struct_ptr->item_position - 1]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (XmStringTable) XtMalloc(num_items * sizeof(XmString *));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (XmStringTable) XtMalloc(MAXFUNTS * sizeof(XmString *));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmCreateScrolledList(drawing_a, "Colors", NULL, 0);
                                                                                                                                                                       if (list_struct_ptr->item_position != num_del_ops + 1) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // Executes menu options from the 'Edit' menu. This is 
// called by either the menu callback function, if the 
// pulldown menus are used, or by the draw() function, 
// if the alt-key combinations are used.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       color_list[i] = XmStringCreateSimple(colors[i]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtAddCallback(list_box, XmNdefaultActionCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                       XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
      XtPointer cb_struct_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringTable color_list, font_list, op_list;
                                                                                                                                                                                                                                    graphic_list.set_undeleted(OPERATOROBJECT,
                                                                                                                                      The last entry in the list is 'Cancel'.
                                                                   (XmListCallbackStruct *) cb_struct_ptr;
                                       KmListCallbackStruct *list_struct_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   color_list_cb, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void handle_edit_options(int item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int i, num_items = XtNumber(colors);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmStringFree(color_list[i]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      for(i = 0; i < num_items; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                for(i = 0; i < num_items; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               for(i = 0; i < MAXFONTS; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Widget list_box, op_box;
char *del_op_str[MAXDELETEDUPS];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtFree((char *) color_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNitemCount, num_items,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNvisibleItemCount, 8,
                                                                                                                                                                                                                                                                                                    save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtManageChild(list_box);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(list_box,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNitems, color_list,
                                                                                                                                                                                                                                                                                                                                                                                                         XtDestroyWidget(widget);
                                                                                                                                                                                                                                                                                                                                         graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         switch(item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      color_list =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     font_list =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            list_box =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int reply;
```

```
rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass, pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, help_dialog,
static void psdl_menu_cb(Widget, XtPointer client_data, XtPointer) {
  int item_no = (int) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                             static void tool_menu_cb(Widget, XtPointer client_data, XtPointer) {
                                                                                                                                                                                                                   static void edit_menu_cb(Widget, XtPointer client_data, XtPointer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void help_cb(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  help_cb(drawing_a, help_menu_files[item_no], call_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                static void help_menu_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Widget help_dialog, pane, text_w, rc, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            action_items[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               help_dialog = XtVaCreatePopupShell("Help",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 xmDialogShellWidgetClass, XtParent(v),
XmNdeleteResponse, XmDESTRUY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // Implemented by Doug Lange 8/19/96
                                                                                                                                                                                                                                                        int item_no = (int) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int item_no = (int) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int item_no = (int) client_data;
                                                                                                                                                                                                                                                                                                                                handle_edit_options(item_no);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          handle_tool_options(item_no);
                                                                                                         handle_psdl_options(item_no);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               {"UK", close_dialog, NULL}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static ActionAreaItem
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char ch, *buf;
int i = 0, n = 0;
int len = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    struct stat statb;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              args[10];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNsashHeight,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 *******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * Menu call-back functions. These functions are called by the window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          * manager when a menu option is selected from a pull-down menu. The
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      static void file_menu_cb(Widget, XtPointer client_data, XtPointer) {
                                     next_action_ptr->next_op = graphic_list.current_op_name();
next_action_ptr->next_op_num = graphic_list.current_op_num();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Colormap cmap = DefaultColormapOfScreen(XtScreen(widget));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (!XAllocNamedColor(dpy, cmap, color, &col, &unused)) {
    warning(drawing_a,"Can't allocate color");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XSetForeground(dpy, std_graphics_context, col.pizel);
                                                                                                                                                                                                                                                                                                                                   XFillRectangle(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * item which was selected is passed in client_data.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                       XFillRectangle(display_ptr, draw_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               warning(drawing_a, "Not yet implemented.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void set_color(Widget widget, char *color) {
    Display *dpy = XtDisplay(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                erase_context, 0, 0, width, height);
                                                                                                                                                                                                                                                                                                                                                                         erase_context, 0, 0, width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void handle_tool_options(int item_no) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int item_no = (int) client_data;
      free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      handle_file_options(item_no);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XColor col, unused;
                                                                                                                return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 default:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          break;
                                                                                                                                                                                                                                                                                              case 4:
                                                                                                                                                                                                                         break;
```

```
// Assign to help
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmVaCreateSimplePulldownMenu(menubar, "edit_menu", 2, edit_menu_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fmVaCreateSimplePulldownMenu(menubar, "psdl_menu", 1, psdl_menu_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmVaCreateSimplePulldownMenu(menubar, "file_menu", 0, file_menu_cb,
                = XmStringCreateSimple("Restore from Save");
= XmStringCreateSimple("Print");
                                                                                                                                                                                                                                                                                                                                                                                                                      = XmStringCreateSimple("Undelete Operator");
= XmStringCreateSimple("Abandon Changes");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = XmStringCreateSimple("Refresh Display");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(menubar, XmNmenuHelpWidget, widget, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = XmStringCreateSimple("Reuse Library");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ilp_menu = XmStringCreateSimple("Help");
psdl_grammar_opt= XmStringCreateSimple("PSDL Grammar");
operator_opt = XmStringCreateSimple("Operators");
                                                                                                                                                                           syntax_check_opt= XmStringCreateSimple("Syntax Check");
                                                                                                                                                                                                                                  goto_parent_opt = XmStringCreateSimple("Go to Parent");
                                                                                                                                                                                                    = XmStringCreateSimple("Go to Root");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = XmStringCreateSimple("Exceptions");
                                                                                                                                                                                                                                                                   = XmStringCreateSimple("Decompose");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NULL, NULL, NULL,
NULL, NULL, NULL,
NULL, NULL, NULL,
NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmvaruSHBUTION, syntax_check_opt, NULL, NULL, NULL,
XmvaruSHBUTION, goto_root_opt, 'R', NULL, NULL,
XmvaruSHBUTION, goto_parent_opt, 'P', NULL, NULL,
XmvaruSHBUTION, decompose_opt, 'D', NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = XmStringCreateSimple("Streams");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     menubar = XmVaCreateSimpleMenuBar(main_w, "menubar",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = XmStringCreateSimple("Timers");
                                                                                                                                                                                                                                                                                                                                                            = XmStringCreateSimple("Color");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = XmStringCreateSimple("Tools");
  XmStringCreateSimple("Save");
                                                                                                                                            = XmStringCreateSimple("PSDL");
                                                                                                                                                                                                                                                                                                                             = XmStringCreateSimple("Edit");
                                                                                                                                                                                                                                                                                                                                                                                       = XmStringCreateSimple("Font");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (widget = XtNameToWidget(menubar, "button_3"))
                                                                                  = XmStringCreateSimple("Exit");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmVaCASCADEBUTTON, help_menu, NULL, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmVaCASCADEBUTTON, file_menu, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmVaCASCADEBUTTON, psdl_menu, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmVaCASCADEBUTTON, edit_menu, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmVaCASCADEBUTTON, tool_menu, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmVaPUSHBUTTON, restore_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmVaPUSHBUTTON, print_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmVaPUSHBUTTON, save_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmVaPUSHBUTTON, exit_opt,
                                                                                                                                                                                                            goto_root_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   stream_opt
exception_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 reuse_lib_opt
                                                                                                                                                                                                                                                                         decombose_opt
                                                                                                                                                                                                                                                                                                                                                                                                                           undelete_opt
                              restore_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                       abandon_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        refresh_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             timer_opt
                                                          print_opt
                                                                                                                                                                                                                                                                                                                                                                 color_opt
                                                                                  exit_opt
                                                                                                                                                                                                                                                                                                                                                                                                font_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           help_menu
                                                                                                                                               psdl_menu
                                                                                                                                                                                                                                                                                                                                edit_menu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  tool_menu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           >
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              color_opt, font_opt, undelete_opt, abandon_opt, refresh_opt, reuse_lib_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   psdl_grammar_opt, operator_opt, stream_opt, exception_opt,
                                                                                                                                                                                                                                                                                                                                                                                             false); n++;
XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Also changed callback names to reflect new labels.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  syntax_check_opt, goto_root_opt, goto_parent_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   file_menu, save_opt, restore_opt, print_opt, exit_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           text_w = XmCreateScrolledText(rc, "help_text", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                          false); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNcursorPositionVisible,false); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                buf); n++;
                                                                                                                                                                                                                                                                                                                                                                 true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          525); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 20); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void build_menu_bar(Widget &main_w, Widget &menubar) {
                                                                                                                                               while (from.get(ch) && (i < HELPSIZ -1)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // 8/4/96 KBM Updated for label changes in Req 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = XmStringCreateSimple("File");
                                                                                  buf = new char[len +1]; // Add a space for NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     action_items[0].data = (XtPointer)help_dialog;
                                                                                                                                                                                                                                                                                                                                                                                             XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                           while (from.get(ch) && (i < len)) {
                           ifstream from((char *)client_data);
len = statb.st_size;
stat((char*)client_data, &statb);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtPopup(help_dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                         XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KtSetArg(args[n], XmNwidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             decombose_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 timer_opt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(pane);
                                                                                                                                                                                                                                                                                               buf[i] = (char)NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtManageChild(rc);
                                                                                                                                                                                                            buf[i] = ch;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Widget widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  psdl_menu,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            edit_menu.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                help_menu,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       tool_menu,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     delete buf;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      file_menu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     >
```

```
&select_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Pixmap &timers_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                &stream_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         BUTTONWIDIH-4, BUTTONWIDIH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                term_button_pixmap = XCreatePixmap(display
BUTTONWIDTH-4, BUTTONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BUTTONWIDTH-4, BUTTONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  spec_button_pixmap = XCreatePixmap(display
BUTIONWIDTH-4, BUTIONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               &types_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BUTTONWIDTH-4, BUTTONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                         &term_button_pixmap,
                                                                                                                                                                                                                                                                                                                                 Pixmap &op_button_pixmap,
                                                                                                                                                                Widget &timers_button,
Widget &select_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Display *display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Pixmap &informal_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Pixmap &spec_button_pixmap,
                                                                                                                                                                                                                        Widget &informal_button,
                                                       Widget &types_button,
                                                                                                                                                                                                                                                                                                                                                                                         Pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Screen *screen_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                Pixmap
                                                                                                              Widget &spec_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       op_button_pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                      XmVaCreateSimplePulldownMenu(menubar, "tool_menu", 3, tool_menu_cb, XmVaPUSHBUTION, reuse_lib_opt, 'U', NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KmVaCreateSimplePulldownMenu(menubar, "help_menu", 3, help_menu_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmVaPUSHBUTTON, psdl_grammar_opt, NULL, NULL, NULL,
XmVaPUSHBUTTON, operator_opt, NULL, NULL, NULL.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL, NULL, NULL, NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Creates the push buttons used to select the tools.
NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, NULL, 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Widget &term_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmStringFree(syntax_check_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmStringFree(psdl_grammar_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmStringFree(goto_parent_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmVaPUSHBUTTON, exception_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void make_buttons(Widget &rowcol,
                                                       XmVaPUSHBUTTON, font_opt,
XmVaPUSHBUTTON, undelete_opt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmStringFree(goto_root_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmStringFree(decompose_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmStringFree(reuse_lib_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmStringFree(exception_opt);
                                                                                                                                                                XmVaPUSHBUTTON, abandon_opt,
                                                                                                                                                                                                                   XmVaPUSHBUTTON, refresh_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmVaPUSHBUTTON, stream_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           KmStringFree(operator_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmStringFree(undelete_opt);
XmVaPUSHBUTTON, color_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmVaPUSHBUTTON, timer_opt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmStringFree(restore_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmStringFree(abandon_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmStringFree(refresh_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(stream_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(color_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(print_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringFree(exit_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(timer_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmStringFree(font_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmStringFree(save_opt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmStringFree(help_menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (mStringFree (psdl_menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (mStringFree(file_menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       //XmStringFree(tool_menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (mStringFree(edit_menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget &stream_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Widget &op_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NULL);
                                                                                                                                                                                                                                                                               NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       >
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types_btn_bb, spec_btn_bb, timers_btn_bb, informal_btn_bb;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static Widget op_btn_bb, term_btn_bb, stream_btn_bb, select_btn_bb,
                                                                                                // current op impl
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = XCreatePixmap(display_ptr, root_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          stream_button_pixmap = XCreatePixmap(display_ptr, root_window,
BUTIONWIDTH-4, BUTTONWIDTH-4, screan_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = XCreatePixmap(display_ptr, root_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  types_button_pixmap = XCreatePixmap(display_ptr, root_window, BUTTONWIDTH-4, BUTTONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           select_button_pixmap = XCreatePixmap(display_ptr, root_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = XCreatePixmap(display_ptr, root_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         timers_button_pixmap = XCreatePixmap(display_ptr, root_window,
BUTIONWIDTH-4, BUTTONWIDTH-4, screen_depth);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     informal_button_pixmap = XCreatePixmap(display_ptr, root_window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            unsigned int screen_depth = DefaultDepthOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XFillRectangle(display_ptr, (Drawable) stream_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XFillRectangle(display_ptr, (Drawable) select_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XFillRectangle(display_ptr, (Drawable) types_button_pixmap,
erase_context, 0, 0, BUTIONWIDTH-4, BUTIONWIDTH-4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XFillRectangle(display_ptr, (Drawable) term_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KFillRectangle(display_ptr, (Drawable) spec_button_pixmap,
erase_context, 0, 0, BUTTONWIDTH-4, BUTTONWIDTH-4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XFillRectangle(display_ptr, (Drawable) op_button_pixmap,
erase_context, 0, 0, BUTTONWIDTH-4, BUTTONWIDTH-4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Window root_window = RootWindowOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             erase_context, 0, 0, BUTTONWIDTH-4, BUTTONWIDTH-4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            srase_context, 0, 0, BUTTONWIDIH-4, BUTTONWIDIH-4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                srase_context, 0, 0, BUTTONWIDTH-4, BUTTONWIDTH-4);
// types
// current op spec
                                                                                                                                              // current op impl
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stream_button = XtVaCreateManagedWidget("stream_button", select_button = XtVaCreateManagedWidget("select_button", xmSeparatorWidgetClass, rowcol, button_divider = XtVaCreateManagedWidget("separator", term_button = XtVaCreateManagedWidget("term_button", button_label = XmStringCreateSimple(" Select"); button_label = XmStringCreateSimple(" Stream"); //XmNlabelPixmap, op_button_pixmap, //XmNlabelPixmap, op_button_pixmap, //XmNlabelPixmap, op_button_pixmap, XmStringFree(button_label); XmNlabelString, button_label, //XmNlabelType, XmPIXMAP, XmNlabelString, button_label, //XmNlabelType, XmPIXMAP, XmStringFree(button_label); XmStringFree(button_label); XmNlabelString, button_label, //XmNlabelType, XmPIXMAP, XmNshadowType, XmSHADOW_DUT, XmNwidth, BUTTONWIDTH, XmNpushButtonEnabled, false, XmNpushButtonEnabled, false, XmNshadowType, XmSHADOW_DUT, XmNrecomputeSize, false, XmNpushButtonEnabled, false, XmNshadowType, XmSHADGW_GUT, XmNwidth, BUTTONWIDTH, xmDrawnButtonWidgetClass, xmDrawnButtonWidgetClass, xmDrawnButtonWidgetClass, XmNrecomputeSize, false, XmNrecomputeSize, false, XmNlabelType, XmSTRING, XmNheight, BUTTONWIDTH, XmNlabelType, XmSTRING, XmNlabelType, XmSTRING, XmNheight, BUTTONWIDTH XmNwidth, BUTTONWIDTH, KmNheight, BUTTONWIDTH rowcol. rowcol, rowcol, (ULL); std_graphics_context, 5, (BUTTONWIDTH/2)+5, "informal", 8);
XDrawString(display_ptr, (Drawable) informal_button_pixmap,
std_graphics_context, 10, (BUTTONWIDTH/2)+18, "Desc ", 6); XDrawString(display_ptr, (Drawable) spec_button_pixmap, std_graphics_context, 10, (BUTIONWIDIH/2)+5, "Spec ", 6); XDrawString(display_ptr, (Drawable) timers_button_pixmap, std_graphics_context, 10, (BUTIONWIDTH/2)+5, "Timers", 6); std_graphics_context, 10, (BUTTONWIDTH/2)+5, "Select", 6); std_graphics_context, 10, (BUTIONWIDIH/2)+5, "Types ", 6); std_graphics_context, 10, (BUTTONWIDIH/2)-8, "Graph ", 6); XFillRectangle(display_ptr, (Drawable) timers_button_pixmap,
erase_context, 0, 0, BUTIONWIDTH-4, BUTIONWIDTH-4);
XFillRectangle(display_ptr, (Drawable) informal_button_pixmap, XDrawString(display_ptr, (Drawable) informal_button_pixmap, XDrawString(display_ptr, (Drawable) informal_button_pixmap, KDrawRectangle(display_ptr, (Drawable) term_button_pixmap, XDrawString(display_ptr, (Drawable) select_button_pixmap, XDrawString(display_ptr, (Drawable) types_button_pirmap, XSetLineAttributes(display_ptr, std_graphics_context, 2, LineSolid, CapButt, JoinMiter); XDrawLine(display_ptr, (Drawable) stream_button_pixmap, erase_context, 0, 0, BUTTONWIDTH-4, BUTTONWIDTH-4); 10, 15, BUTTONWIDTH-(2*10), BUTTONWIDTH-(2*10)); KDrawArc(display_ptr, (Drawable) op_button_pixmap, 10, 15, BUTTONWIDTH-(3*10), BUTTONWIDTH-(3*10), button_label = XmStringCreateSimple("Operator"); op_button = XtVaCreateManagedWidget("op_button", 10, 15, BUTTONWIDTH-(3*10), BUTTONWIDTH-(3*10)); button_label = XmStringCreateSimple(" Term"); std_graphics_context, //XmNlabelPirmap, op_button_pirmap, std_graphics_context, std_graphics_context, CIRCLE BEGIN, FULL CIRCLE); XmStringFree(button_label); XmNlabelString, button_label,
//xmNlabelType, XmPIXMAP, XmNpushButtonEnabled, false, XmNshadowType, XmSHADOW_OUT, xmDrawnButtonWidgetClass, XmString button_label; XmNrecomputeSize, false, XmNlabelType, XmSTRING, XmNheight, BUTTONWIDTH KmNwidth, BUTTONWIDTH,

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// When the display function is set to GXzor, the pixel being
// written is exclusive-or'ed with the target pixel to
// determine color. This means that writing the same pixel with
                                                                                                                                                                            informal_button = XtVaCreateManagedWidget("informal_button",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          drawing_area_pixmap, temp_ptr_>window, std_graphics_context, 0, 0, width, height, 0, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XSetLineAttributes(display_ptr, std_graphics_context, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 LineSolid, CapButt, JoinMiter);
                                                       XmStringFree(button_label);
button_label = XmStringCreateLtoR(" Graph\n Desc",
XmSTRING_DEFAULT_CHARSET);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void draw_handle(GC graphics_context, int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // Draws a square black box on the canvas to aid in
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_ptr = (XmDrawingAreaCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XCopyArea(temp_ptr->event->xexpose.display,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmDrawingAreaCallbackStruct *temp_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //KmNlabelPixmap, op_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // graphic manipulation of objects.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // Redraws the drawing canvas.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void redraw(Widget, XtPointer,
                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNlabelString, button_label,
//xmNlabelType, XmPIXMAP,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringFree(button_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtPointer cbs) {
                                                                                                                                                                                                                                                                                                      XmNpushButtonEnabled, false,
                                                                                                                                                                                                                                                                                                                               XmNshadowType, XmSHADOW_OUT,
                                                                                                                                                                                                          xmDrawnButtonWidgetClass,
                                                                                                                                                                                                                                                                       XmNrecomputeSize, false,
                                                                                                                                                                                                                                                                                                                                                                                            XmNheight, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                             XmNlabelType, XmSTRING,
                                                                                                                                                                                                                                                                                                                                                                XmNvidth, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          x -= HANDLESIZE / 2;
y -= HANDLESIZE / 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (x < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (y < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   x = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          y = 0;
                                                                                                                                                                                                                                            rowcol.
NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                timers_button = XtVaCreateManagedWidget("timers_button",
                                                                                                                                                                                                          types_button = XtVaCreateManagedWidget("types_button",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              spec_button = XtVaCreateManagedWidget("spec_button",
                                                                                                                                                button_label = XmStringCreateSimple(" Types");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     button_label = XmStringCreateSimple(" Timers");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 button_label = XmStringCreateSimple(" Spec");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  //XmNlabelPixmap, op_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           //XmNlabelPixmap, op_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     //XmNlabelPixmap, op_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNlabelString, button_label,
//XmNlabelType, XmPIXMAP,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmStringFree(button_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNlabelString, button_label,
//XmNlabelType, XmPIXMAP,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmStringFree(button_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNlabelString, button_label,
//xmNlabelType, XmPIXMAP,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNshadowType, XmSHADOW_OUT,
XmNwidth, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                     KmNpushButtonEnabled, false,
                                                                                                                                                                                                                                                                                                                                                                XmNshadowType, XmSHADUW_OUT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KmNpushButtonEnabled, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KENShadowType, XmSHADDW_DUT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNpushButtonEnabled, false,
                              XmNwidth, WIN_WIDTH,
                                                                                                                                                                                                                                            xmDrawnButtonWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EmDrawnButtonWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              xmDrawnButtonWidgetClass,
ROW14 - 8,
                                                                                                                                                                                                                                                                                                   XmNrecomputeSize, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KmNrecomputeSize, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNrecomputeSize, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNlabelType, XmSTRING,
                                                                                                                                                                                                                                                                                                                                                                                                                           KmNheight, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KmNheight, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KmNlabelType, XmSTRING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KmNlabelType, XmSTRING,
                                                                                                                                                                                                                                                                                                                                                                                               KmNwidth, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KmNheight, BUTTONWIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNwidth, BUTTONWIDTH,
                                                             NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           rowcol,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                rowcol,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            WLL);
```

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last_point_x, last_point_y, x_state, y_state);
XDrawLine(display_ptr, drawing_area_pixmap, dotted_context,
last_point_x, last_point_y, x_state, y_state);
                                                                                                                                                 // click is registered, the user wants to terminate an external
                                                                                                                                                                                                                                                                     void handle_null_point(OP_ID from_stream_id, int &last_point_x,
                             // This function is called when a stream is being drawn
// and the mouse is clicked on either a clear spot on the
// drawing canvas, or on top of another stream. If a double-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          O, UNDEFINED_TIME, MS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    cout << "ge: " << x_state << " " << y_state << " " <
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  erase_guides(from_stream_id, temp_spline_ptr);
OP_ID new_id = graphic_list.request_id(STREAMOBJECT);
temp_stream_ptr = new StreamObject("", new_id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        draw_handle(std_graphics_context, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XDrawLine(display_ptr, draw_window, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      from_stream_id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_stream_ptr->set_object_ptrs(&graphic_list);
                                                                                                                                                                                                                                                                                                                                                                                                                             SplineObject *temp_spline_ptr, BOOLEAN &done,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ((last_point_x + (HANDLESIZE / 2) + HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ((last_point_y - (HANDLESIZE / 2) - HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ((last_point_y + (HANDLESIZE / 2) + HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ((last_point_x - (HANDLESIZE / 2) - HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if ((from_stream_id != UNDEFINED_OPNUM) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Checks for two clicks in the same spot.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_spline_ptr->add(x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             StreamObject *&temp_stream_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   graphic_list.add(temp_stream_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GraphObject *&temp_object_ptr,
                                                                                                                                                                                                                                                                                                                                          int &x_state, int &y_state,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_stream_ptr->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   x_state = in_event.rbutton.x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       y_state = in_event.xbutton.y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         < in_event.xbutton.x) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  > in_event.xbutton.x) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              < in_event.xbutton.y) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          > in_event.xbutton.y)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_spline_ptr->clear();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_spline_ptr,// @6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_stream_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                             int &last_point_y,
                                                                                                                                                                                                                                                                                                                                                                                         XEvent in_event,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          true, false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          done = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #ifdef GE_DEBUG
                                                                                                                                                                                                stream.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         >
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void erase_guides(OP_ID from_stream_id, SplineObject *temp_spline_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           graphic_list.target_object(OPERATOROBJECT, from_stream_id);
// the same color twice restores the original color, simplifying
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // next segment. When the next segment is written in xor mode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // erased handle makes an erased blotch in the beginning of the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // it makes a black mark where the erased handle overwrote the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XDrawLine (display_ptr,drawing_area_pixmap, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                draw_handle(std_graphics_context, line_end.x, line_end.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Since each
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             This function erases the temporary guidelines used when
                                                                                                         XSetFunction(display_ptr, graphics_context, GXxor);
XFillRectangle(display_ptr, draw_window, graphics_context,
x, y, HANDLESIZE, HANDLESIZE);
XFillRectangle(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // handle is overwritten with the following dotted line, an
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XDrawLine(display_ptr, draw_window, dotted_context,
                                                                                                                                                                                                                                                                                                                                                 XSetFunction(display_ptr, graphics_context, GXcopy);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              line_start.r, line_start.y, line_end.r,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               line_start.x, line_start.y, line_end.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Dotted lines are erased first, then handles.
                                                                                                                                                                                                                                                                                                     x, y, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           line_start = temp_spline_ptr->next_pair();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              line_start = temp_operator_ptr->center();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   line_end = temp_spline_ptr->next_pair();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        line_end = temp_spline_ptr->next_pair();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_spline_ptr->reset_iter();
if (from_stream_id != UNDEFINED_OPNUM) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      line_end = temp_spline_ptr->next_pair();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   line_end = temp_spline_ptr->next_pair();
while(line_end.x != -1) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_operator_ptr = (OperatorObject *)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OperatorObject *temp_operator_ptr;
                             // the process of erasing handles.
                                                                                                                                                                                                                                                                     graphics_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_spline_ptr->reset_iter();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XYPAIR line_start, line_end;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // beginning of its segment.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              while(line_end.x != -1) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      line_end.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          line_end.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               line_start = line_end;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     streams are drawn.
```

```
temp_object_ptr = graphic_list.hit(in_event.rbutton.x, in_event.rbutton.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     last_point_x, last_point_y, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           last_point_x, last_point_y, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   last_point_x, last_point_y, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    dotted_context, last_point_x, last_point_y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           dotted_context, last_point_x, last_point_y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          dotted_context, last_point_x, last_point_y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XDrawLine(display_ptr, draw_window, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XDrawLine(display_ptr, draw_window, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XDrawLine(display_ptr, draw_window, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XDrawLine(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XDrawLine(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XDrawLine (display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                             while (done == false) { // monitors the event loop
                            conv_ptr = (OperatorObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (in_event.xbutton.window == draw_window) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (in_event.type == ButtonPress) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cout << "buttonpress" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         cout << "keypress" << endl;
                                                                                                                                                                                                                                                                                                                                           XSelectInput(display_ptr, draw_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                          XNextEvent(display_ptr, &in_event);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cout << "Motion" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       x_state = in_event.xbutton.x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    y_state = in_event.xbutton.y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        x_state, y_state);
                                                         from_stream_id = conv_ptr->id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                x_state, y_state);
                                                                                                                      temp_pair = conv_ptr->center();
                                                                                                                                                                                                                                                                                                                                                                                   stream_event_mask);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            switch(in_event.type) {
                                                                                                                                                        x_state = temp_pair.x;
                                                                                      temp_object_ptr = NULL;
                                                                                                                                                                                     y_state = temp_pair.y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case MotionNotify:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      case ButtonPress:
                                                                                                                                                                                                                                                                                 last_point_x = x_state;
                                                                                                                                                                                                                                                                                                                 last_point_y = y_state;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      unsigned long normal_mask = (ButtonPressMask | PointerMotionMask |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (ButtonPressMask | PointerMotionMask |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ButtonMotionMask | ExposureMask |
                                                                                                                                                                                                                                                  // Once the user selects the Stream Tool and begins to draw,
// the draw_stream() function handles all events to speed up
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_object_ptr = graphic_list.hit(initial_x, initial_y);
if (temp_object_ptr == NULL) { // External stream
from_stream_id = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int count = 0; // added for req #6.4 dha
int bufsize = INPUT_LINE_SIZE; // added for req #6.4 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw_handle(std_graphics_context, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char buffer[INPUT_LINE_SIZE]; // added for req #6.4 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  draw_handle(std_graphics_context, x_state, y_state);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (temp_object_ptr->is_a() != OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int x_state, y_state, last_point_x, last_point_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ButtonReleaseMask);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_spline_ptr->add(initial_x, initial_y);
                                                                                                                                                                                                                                                                                                                                                                             void draw_stream(int initial_x, int initial_y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_spline_ptr->add(initial_x, initial_y);
x_state = initial_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KeyPressMask |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KeyPressMask);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KeySym keysym; // added for req #6.4 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     from_stream_id = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_spline_ptr = new SplineObject;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     unsigned long stream_event_mask =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SplineObject *temp_spline_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       StreamObject *temp_stream_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                             GraphObject *temp_object_ptr;
                                                      last_point_x = x_state;
last_point_y = y_state;
HANDLESIZE << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                             OperatorObject *conv_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       x_state = initial_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 y_state = initial_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               y_state = initial_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OP_ID from_stream_id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN done = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // External Stream
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XYPAIR temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KEvent in_event;
                                                                                                                                                                                                                                                                                                                 // performance.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else {
                               #endif
```

```
void draw(Widget, XEvent *event, String *args, Cardinal *) { // void draw
static char string[INPUT_LINE_SIZE]; // added for req #6.1.1 dha
static.OperatorObject *temp_operator_ptr = NULL;
static StreamObject *temp_stream_ptr = NULL;
static BUDLEAN first_draw = true, handle_selected = false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               text_selected = false, drawing_changed = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XDrawRectangle(display_ptr, draw_window, dotted_context,
x - width / 2, y - height / 2, width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // window manager every time the mouse is moved, a mouse button
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // called with a string token that indicates why it was called,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      dotted_context, x - width / 2, y - height / 2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void draw_text_shadow(int x, int y, int width, int height) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int bufsize = INPUT_LINE_SIZE; // added for req #6.1.1 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // pressed, or a key pressed inside the draw window. It is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static int x_state, y_state, shadow_height, shadow_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            The main draw routine. This function is called by the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char buffer[INPUT_LINE_SIZE]; // added for req #6.1.1 dha
                                                                                                                                                                                                                                                                                                                                      XSelectInput(display_ptr, draw_window, normal_mask);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XDrawRectangle(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Draws the outline of the text being moved.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                static GraphObject *ibar_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int length = 0; // added for req #6.1.1 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int count = 0; // added for req #6.1.1 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KeySym keysym; // added for req #6.1.1 dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // and processes the event accordingly.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           GraphObject *temp_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN state_change, type_match;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         static OP_ID from_stream_id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OperatorObject *conv_op_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StreamObject *conv_st_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int y = event->xbutton.y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int x = event->xbutton.x;
                                                                                                                                                                                                                                                         } //while done == false
                                                                                                                                                                                                                    } //if right window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *warningMSG;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *labelName;
                                                                                                                                                                                  } //switch
   break;
                                                                          default:
                                                                                                                                                break;
                                                                                                                                                                                                                                                                                                 done = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char
                                                                                                                                                                                                                                                                                                                               OP_ID new_id = graphic_list.request_id(STREAMOBJECT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_spline_ptr, true, false);
                                                                                                                                                temp_object_ptr, temp_stream_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       is_a(), deleted_op_id);
                                                                                                                                                                                                                                                                                                                                                                                                      new StreamObject ("", new_id, from_stream_id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_stream_ptr->set_object_ptrs(&graphic_list);
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_object_ptr, temp_stream_ptr);
                                                                                                           in_event, temp_spline_ptr, done,
                                                                      last_point_y, x_state, y_state,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              handle_null_point(from_stream_id, last_point_x,
                                                                                                                                                                                                                                                     if (temp_object_ptr->is_a() == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                          erase_guides(from_stream_id, temp_spline_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         //DP_ID deleted_op_id = temp_stream_ptr->id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  //graphic_list.delete_notify(temp_stream_ptr->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      last_point_y, x_state, y_state,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        in_event, temp_spline_ptr, done,
                                 handle_null_point(from_stream_id, last_point_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          buffer[count] = NULL; /* add NULL terminator */
                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_object_ptr->id(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (temp_object_ptr->is_a() == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         count = XLookupString(&in_event.xkey, buffer,
bufsize, &keysym, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              graphic_list.add(temp_stream_ptr);
temp_stream_ptr->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     //temp_stream_ptr->set_deleted();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (in_event.type == KeyPress) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           //temp_stream_ptr->erase();
if (temp_object_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          //temp_stream_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_spline_ptr->clear();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (keysym == XK_Escape) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XBell(display_ptr, 100);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_stream_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                        temp_stream_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             UNDEFINED_TIME, MS, // 06
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               done = true:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         done = true;
```

300LEAN type_operator;

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// added 8/22/96 dha, // req. 6.2 & 6.3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           } // tool_state == OPERATOR_TOOL || TERMINATOR_TOOL && ibar_mode ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_operator_ptr =
// BRUCKEII 1/22/93 default x and y values changed from 0 to 100
new OperatorObject("", UNDEFINED_OPNUM, UNDEFINED_OPNUM, UNDEFINED_OPNUM, UNDEFINED_TIME, MS, conv_op_ptr->x(), // @6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_operator_ptr =
// BROCKETT 1/22/93 default x and y values changed from 0 to 100
                                                                                                                                                                                                                                                                                                                                                                                                                                    st_being_updated = (StreamObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                             conv_op_ptr->is_terminator());
} else if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               OP_ID new_id = graphic_list.request_id(OPERATOROBJECT);
                                                                                                                                                                                                                                                                                      conv_op_ptr->is_composite(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               default_color, true, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        graphic_list.add((GraphObject *) temp_operator_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DEPONDED TO THE HE OPERATOR OF THE OPERATOR OF THE OPERATOR OF THE HE OPERATOR OF THE OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERATOR OPERAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OP_ID new_op = graphic_list.request_id(OPERATOROBJECT);
                                                                                                                                                                                conv_op_ptr->radius(),
                                                                                                                                                                                                                                     default_color, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (tool_state == TERMINATUR_TOOL)) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    new OperatorObject("", new_id, new_op
UNDEFINED_IIME, MS, 100, 100, 30, // e6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else { // button down, operator tool selected?
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // (ibar_mode != true)) ||
// (object_def != DPERATOROBJECT)) {
if ((tool_state == DPERATOR_TUUL) ||
                                                                                                                               conv_op_ptr->y(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_operator_ptr->set_location(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (((tool_state == OPERATOR_TOOL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_operator_ptr->set_location(x, y);
} // tool_sate == OPERATOR_TOUL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else // button down, stream tool selected?
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (tool_state == TERMINATOR_TOOL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       } // tool_state == TERMINATOR_TOOL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (tool_state == OPERATOR_TOOL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          true):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_operator_ptr->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else { // No object selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              } // temp_object_ptr != NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (tool_state == TERMINATOR_TOOL)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 delete temp_operator_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_operator_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   } // handle_selected == false
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         } /// tool_state == SELECT_TOOL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_operator_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   new OperatorObject("", UNDEFINED_OPNUM, UNDEFINED_OPNUM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           op_being_updated = (OperatorObject *)selected_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     st_being_updated = (StreamObject *)selected_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  conv_op_ptr = (OperatorObject *) selected_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_being_updated = (OperatorObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   conv_op_ptr->is_terminator());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Unselects previously selected object
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     text_selected = selected_object_ptr->text_selected();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           conv_op_ptr->is_composite(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               conv_op_ptr = (OperatorObject *) temp_object_ptr;
                                                                                                                     (strcmp(args[0], "down") == 0) { // Button pressed
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           conv_op_ptr->radius(),
                                                                                                                                                                                                                                     XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           default_color, false,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (selected_object_ptr->hit_handle(x, y)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               object_def = selected_object_ptr->is_a();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_operator_ptr->set_handle_selected(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         conv_op_ptr->handle_selected());
} else if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          conv_op_ptr->y(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_object_ptr = graphic_list.hit(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    selected_object_ptr = temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           object_def = temp_object_ptr->is_a();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // selected_object_ptr->hit_handle()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Makes temporary operator to move around
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (object_def == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    UNDEFINED_TIME, MS, conv_op_ptr->x(), // 06
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (object_def == OPERATOROBJECT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   selected_object_ptr->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                              if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // selected_object_ptr != NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 delete temp_operator_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (handle_selected == false) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   delete temp_operator_ptr;
                                                                                                                                                                                                                                                                                                                                                                                             if (tool_state == SELECT_TOOL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_object_ptr->select();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          delete temp_operator_ptr;
temp_operator_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  handle_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         handle_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_operator_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_operator_ptr =
                                                                                                                                                                                         clear_status();
                                                                                                                                                                                                                                                                                                x_state = x;
```

```
cerr << "It is an Operator Object" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                cerr << "It is an Stream Object" << endl;
                                                                                                                                                                                                                                       draw_handle(std_graphics_context, x_state, y_state);
draw_handle(std_graphics_context, x, y);
selected_object_ptr->move_handle(x - x_state,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_object_ptr = graphic_list.over(x, y);
if (temp_object_ptr != NULL) {
   object_def = temp_object_ptr->is_a();
   if (object_def == OPERATOROBJECT) {
                                                                                      conv_st_ptr->erase_handle();
draw_handle(std_graphics_context, x, y);
                                                          (StreamObject *) selected_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          } // object_def == OPERATOROBJECT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        setcursor(drawing_a, True, XC_xterm);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // selected_object_ptr != NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              setcursor(drawing_a, True, XC_xterm);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          setcursor(drawing_a, False, None);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              } // tool_state == SELECT_TOOL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 } // temp_object_ptr != NULL
else { // No object selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   } // object_def == STREAMOBJECT
                                                                                                                                                                                                                                                                                                                                                                                             } // handle_selected
                                                                                                                                                                                                                                                                                                                                                                                                                           } // is_a STREAMOBJECT
  if (first_draw == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // I-bar mode check
                                                                                                                                                first_draw = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ibar_mode = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ibar_mode = true;
                                                                                                                                                                                                                                                                                                                                     y - y_state);
                                    conv_st_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef GE_DEBUG
                                                                                                                                                                            } // first_draw
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          x_state = x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      y_state = y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         draw_text_shadow(x_state, y_state, shadow_width, shadow_height);
                                                                                      } // button down, operator tool selected?
} else if (strcmp(args[0], "motion") == 0) { // button not down
if (tool_state == SELECI_IOUL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // moving an object, it is drawn once the first and last time,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Drawing the same thing twice in xor mode erases it. When
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     draw_text_shadow(x, y, shadow_width, shadow_height);
                                                                                                                                                                                                                                                                                                                                  shadow_height = selected_object_ptr->text_height();
draw_text_shadow(x, y, shadow_width, shadow_height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_operator_ptr->move(x - x_state, y - y_state);
temp_operator_ptr->draw(DUTIED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (selected_object_ptr->is_a() == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (selected_object_ptr->is_a() == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                       shadow_width = selected_object_ptr->text_width();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_operator_ptr->move_handle(x - x_state,
                                                                                                                                                                         if (selected_object_ptr != NULL) {
if (tool_state == STREAM_TOOL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (handle_selected == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      selected_object_ptr->draw(SOLID);
temp_operator_ptr->draw(DOTTED);
first_draw = false;
} // first_draw
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 selected_object_ptr->erase();
selected_object_ptr->enselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_operator_ptr->draw(DUTTED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (first_draw == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (first_draw == true)
                                 draw_stream(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (handle_selected) {
                                                                                                                                                                                                                                                                     if (first_draw == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    } // is_a OPERATAOROBJECT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   } // handle_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // and twice afterwards
                                                                                                                                                                                                             drawing_changed = true;
                                                                                                                                                                                                                                                                                                                                                                                             first_draw = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              y - y_state);
                                                                                                                                                                                                                                         if (text_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        first_draw = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               } // text_selected
                                                                                                                                                                                                                                                                                                                                                                                                                         } // first_draw
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         9139
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ij
```

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graphic_list.avail_impl_langs_adr(),
                                                                                                                  if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else { // No object selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ibar_mode = true;
                                                                                                                                                                                                                                                                                                                                                        } // ibar_mode
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ibar_mode = true;
                                &graphic_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      0180
                                                                                                                                                                                                                                                                    else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // op_being_updated = (OperatorObject *) temp_object_ptr;
operator_property_dialog(drawing_a, op_being_updated, x, y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              draw_handle(std_graphics_context, x_state, y_state); } // is_a STREAMOBJECT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 conv_op_ptr->radius(temp_operator_ptr->radius());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (selected_object_ptr->is_a() == OPERATOROBJECT) {
   if (first_draw == false) {
// cerr << "No object selected Object" << endl; #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   graphic_list.move_notify(selected_object_ptr->is_a(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XYPAIR temp_pair = temp_operator_ptr->center();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if ((selected_object_ptr->is_a() == STREAMOBJECT)
&& (handle_selected)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     } else if (strcmp(args[0], "btn3down") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               conv_op_ptr->set_location(temp_pair.x,
                                                                                                                                                                                                                                                                                                                                                                                    selected_object_ptr->text_locate(x, y);
                                                                                                                                                                           } else if (strcmp(args[0], "up") == 0) {
  if (tool_state == SELECT_TOOL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (object_def == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 conv_op_ptr->set_default_text_location();
                                                                                                                  setcursor(drawing_a, False, None); } // No object selected
                                                                                                                                                                                                                                    if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (OperatorObject *) selected_object_ptr;
                                                                                                                                                                                                                                                                                                                             draw_text_shadow(x_state, y_state,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_operator_ptr->draw(DOTTED);
                                                                                                                                                                                                                                                                                                                                                                                                                 save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 } // selected_object_ptr != NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     graphic_list.cur_op_is_terminator(),
                                                                                                                                                                                                                                                                                                                                                           shadow_width, shadow_height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              selected_object_ptr->id());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (drawing_changed == true) {
                                                                                                                                                                                                                                                                                               if (first_draw == false) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (ibar_mode == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (handle_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       drawing_changed = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       } // is_a OPERATOROBJECT
                                                                                         ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   handle_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               first_draw = true;
                                                                                                                                                                                                                                                                 if (text_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        } // drawing_changed
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              conv_op_ptr =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // first_draw
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             } // text_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                               } // first_draw
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_pair.y);
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XFlush(XtDisplay(drawing_a));/* Stub for Non Operator of Stream */
                                                                                                          // XFlush(XtDisplay(drawing_a)); /* Stub for stream code */
stream_property_dialog(drawing_a, st_being_updated, x, y,
&graphic_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 op_being_updated = (OperatorObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   st_being_updated = (StreamObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                         } else if (strcmp(args[0], "btn3motion") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cerr << "No object selected Object" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // cerr << "It is an Operator Object" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // cerr << "It is an Stream Object" << endl; #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                       temp_object_ptr = graphic_list.over(x, y);
if (temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      object_def = temp_object_ptr->is_a();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                setcursor(drawing_a, True, XC_left_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (object_def == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   setcursor(drawing.a, True, XC_xterm);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     setcursor(drawing_a, True, XC_xterm);
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"Simple Operator Names must be unique to level: %s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                    } else if (!type_operator && !graphic_list.unique_op_id(labelName,
((OperatorObject *)ibar_object_ptr)->id())) {
                                                                       "A Composite Operator can not be a Type: %s", labelName);
((((OperatorObject *)ibar_object_ptr)->is_composite())) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     update_status("Operators that are not types must have a "
                                                                                                                                                                                                                                                                                                                                            ((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                      update_status("Composite Operator can not be a Type:"
                                                                                                                                                                                                                                                                     ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    op_being_updated = (OperatorObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                            ((OperatorObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ((OperatorObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // cerr << "It is an Stream Object" << endl; #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cerr << "It is an Operator Object" << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_object_ptr = graphic_list.over(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           object_def = temp_object_ptr->is_a();
if (object_def == OPERATORUBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            setcursor(drawing_a, True, XC_xterm);
                                                                                                                                                                                          rename operator or make Automic",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         setcursor(drawing_a, True, XC_xterm);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 warning(drawing_a, warningMSG);
                                                                                                                      warning (drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (object_def == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ibar_object_ptr = NULL;
                                       sprintf (warningMSG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          sprintf (warningMSG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                string[0] = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               buffer[0] = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif /* GE_DEBUG */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "unique name",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ibar_mode = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free (labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ibar_mode = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              update_status("Illegal operator name, retype:"
" op_id ::= [id '.'] op_name ['(' [id_list] '|' [id_list] ')'",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     "Illegal stream name, retype: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      } else if (is_keyword(labelName, false)) {
   sprintf(warningMSG,"Stream name is a keyword: %s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "Invalid operator name (syntax or keyword): %s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            update_status("Stream name is a keyword, retype", RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  sprintf(warningMSG, "Invalid stream name: "s", labelName);
                                                                                                       XFlush(XtDisplay(drawing_a)); /* Stub for stream code */
} else if (strcmp(args[0], "motionnotify") == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // Valid stream name, get any existing type information
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ((OperatorObject *)ibar_object_ptr)->name("");
((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
} else if (type_operator &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     labelName = ((OperatorObject *)ibar_object_ptr)->name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              type_match = graphic_list.fetch_matching_stream_type(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         type_operator = (strchr(labelName,'.')) ? true : false;
                                                                                                                                                                                                                                                                                                                                            labelName = ((StreamObject *)ibar_object_ptr)->name();
warningMSG = (cher *) malloc(strlen(labelName)+40);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ((StreamObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ((StreamObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ((StreamObject *)ibar_object_ptr)->draw(SULID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    warningMSG = (char *) malloc(strlen(labelName)+80);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ((StreamObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ((StreamObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (StreamObject *)ibar_object_ptr, &state_change);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ((StreamObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ((StreamObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                     if (ibar_object_ptr->is_a() == STREAMOBJECT) {
                                                                       } else if (strcmp(args[0], "btn3up") == 0) {
   setcursor(drawing_a, False, None);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     warning(drawing_a, warningHSG);
                                                                                                                                                                                             if (label_edit_mode == true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (!valid_op_id(labelName)) {
                                                                                                                                                                                                                                     label_edit_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                  if (!valid_id(labelName)) {
                                                                                                                                                                                                                                                                        if (ibar_object_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sprintf (warningMSG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (state_change)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            free(warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        update_status(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free (labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RING_BELL);
```

```
"Illegal stream name, retype: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    sprintf(warningMSG, "Stream name is a keyword: %s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               update_status("Stream name is a keyword, retype", RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sprintf(warningMSG, "Invalid stream name: ",s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Valid stream name, get any existing type information type_match = graphic_list.fetch_matching_stream_type(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if ((keysym == XK_Return) || (keysym == XK_KP_Enter) ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 cout << "key pressed: " << event->xkey.keycode << endl;</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (ibar_object_ptr->is_a() == STREAMOBJECT) {
    labelName = ((StreamObject *)ibar_object_ptr)->name();
    warningMSG = (char *) malloc(strlen(labelName)+40);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ((StreamObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ((StreamObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ((StreamObject *)ibar_object_ptr)->erase_text();
((StreamObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ((StreamObject *)ibar_object_ptr)->erase_text();
st_being_updated = (StreamObject *) temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  buffer[count] = NULL; /* add NULL terminator */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ((StreamObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                            // cerr << "No object selected Object" << endl;
#endif /* GE_DEBUG */</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       count = XLookupString(&event->xkey, buffer,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                } else if (is_keyword(labelName, false)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     } else if (strcmp(args[0], "key") == 0) {
                                                                                                                                                          setcursor(drawing_a, True, XC_left_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  setcursor(drawing.a, False, None);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                             else { // No object selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (label_edit_mode==true) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (!valid_id(labelName)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (keysym == XK_Linefeed)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              bufsize, &keysym, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                label_edit_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (ibar_object_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              update_status(
                                                                                                                      ibar mode = false;
                                                                                                                                                                                                                                                                                                                                                        #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RING_BELL);
                                                                              else {
```

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} else if (!type_operator && !graphic_list.unique_op_id(labelName,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (((OperatorObject *)ibar_object_ptr)->is_composite())) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "A Composite Operator can not be a Type: %s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                varning(drawing_a, warningMSG);
update_status("Illegal operator name, retype: "
'op_id ::= [id '.'] op_name ['(' [id_list] '|' [id_list] ')'",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     update_status("Operators that are not types must have a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              "Invalid operator name (syntax or keyword): "s", labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                               labelName = ((OperatorObject *)ibar_object_ptr)->name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ((OperatorObject *)ibar_object_ptr)->name("");
((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ((OperatorObject *)ibar_object_ptr)->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                           type_operator = (strchr(labelName,'.')) ? true : false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         update_status("Composite Operator can not be a Type:"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   "Simple Operator Names must be unique to level: %s"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ((OperatorObject *)ibar_object_ptr)->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                               warningMSG = (char *) malloc(strlen(labelName)+80);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ((UperatorObject *)ibar_object_ptr)->name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ((OperatorObject *)ibar_object_ptr)->name("");
(StreamObject *)ibar_object_ptr, &state_change);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    } else if ((strchr(labelName,'.') != NULL) &&
                                                                 ((StreamObject *)ibar_object_ptr)->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (((DeratorObject *)ibar_object_ptr)->id())) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      rename operator or make Automic"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               warning(drawing_a, warningMSG);
                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (!valid_op_id(labelName)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 sprintf(warningMSG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   sprintf (warningMSG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           sprintf(warningMSG,
                               if (state_change)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ibar_object_ptr = NULL;
                                                                                                                                                                                    free (warningMSG);
                                                                                                                                              free (labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(labelName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               'unique name",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     string[0] = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        buffer[0] = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RING_BELL);
```

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// alt key pressed
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (keysym == XK_Control_L || keysym == XK_Control_R) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else if (keysym == XK_Meta_L || keysym == XK_Meta_R) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // Control key to activate
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Alt key to activate
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OP_ID deleted_op_id = selected_object_ptr->id();
    save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            graphic_list.delete_notify(selected_object_ptr->
                                                                                                                                                                                                                                                                                                                                                                                                        // Refresh Display
                                                                                                                                                                                                // Goto Parent
                                                                                                                                                                                                                                                                                                    // Goto Root
                                                                                               // Decompose
if (alt_selected || ctrl_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               selected_object_ptr->set_deleted();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   setcursor(drawing_a, False, None);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (selected_object_ptr != NULL) {
   if ((keysym == XK_BackSpace) ||
      (keysym == XK_Delete)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    selected_object_ptr->erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      is_a(), deleted_op_id);
                                                                                                                                               handle_psdl_options(3);
                                                                                                                                                                                                                                                 handle_psdl_options(2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                           handle_edit_options(4);
                                                                                                                                                                                                                                                                                                                                                       handle_psdl_options(1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ctrl_selected = true;
                    alt_selected = false;
ctrl_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            alt_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ibar_mode = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ctrl_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       alt_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           case XK_Control_L:
case XK_Control_R:
                                                                     switch(keysym) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case XK_Meta_L:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 case XK_Meta_R:
                                                                                                                        case XK_d:
                                                                                                                                                                                                                                                                                                  case XK_R:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6186
                                                                                                                                                                                              case XK_P:
                                                                                                                                                                                                                     case XK_p:
                                                                                                                                                                                                                                                                                                                                                                                                      case XK_F:
                                                                                            case XK_D:
                                                                                                                                                                                                                                                                                                                           case XK_r:
                                                                                                                                                                                                                                                                                                                                                                                                                                 case XK_f:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            default:
                                                                                                                                                                         break;
                                                                                                                                                                                                                                                                             break;
                                                                                                                                                                                                                                                                                                                                                                                 break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      break;
         if ((Keysym >= XK_KP_Space) &k (keysym <= XK_KP_9)) |{
   ((keysym >= XK_space) &k (keysym <= XK_ascittilde))) {
   if ((strlen(string) + strlen(buffer)) >= INPUT_LINE_SIZE) {
                                                                                                                                                                                                                                                                                                                                                                                                                          if ((strlen(string) + strlen(buffer)) >= INPUT_LINE_SIZE) {
                                                                                                                                                                                                                                                                      if ((keysym >= XK_Shift_L) && (keysym <= XK_Hyper_R)) {
                                                                                                                                                                                                                                                                                                                                                                          if ((keysym >= XK_F1) &k (keysym <= XK_F35)) {
   if (buffer[0] .!= (char)NUL) {</pre>
                                                                                                                                                                                                                                                                                                  ; /* Do nothing because it's a modifier key */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_object_ptr = graphic_list.over(x, y);
if (temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if ((keysym == XK_BackSpace) ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         object_def = temp_object_ptr->is_a();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if ((length = strlen(string)) > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_object_ptr->draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ibar_object_ptr = temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (object_def == OPERATOROBJECT ||
object_def == STREAMOBJECT)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_object_ptr->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_object_ptr->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (label_edit_mode != false &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_object_ptr->name(string);
                                                                                        XBell(display_ptr, 100);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             string[length - 1] = NULL;
                                                                                                                                                                  strcat(string, buffer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                    XBell(display_ptr, 100);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (keysym == XK_Delete)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XBell(display_ptr, 100);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              strcat(string, buffer);
                                                                                                                                           else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                 6156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               > 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ij
```

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Callback function. Called when Terminator Tool button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // Callback function. Called when Timer Tool OK button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void timer_tool_ok_cb(Widget parent, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                             XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              idp->next = (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                               void term_button_cb(Widget, XtPointer, XtPointer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void null_cb(Widget, XtPointer, XtPointer) {}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (u_bound > 0) {
  idp = (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Astrlist,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  for (int i = 1; i < u_bound; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // pressed. DL 8/22/96; KBM 10/24/96
                                                                                                                                                                                                                                                                                                                                                                                            selected_object_ptr->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 idp, timers;
                                                                                                                                                                                                                                                                      select_state(TERMINATOR_TOOL);
selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                          selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *strlist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          u_bound;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNitemCount,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         *text:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNitems,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaGetValues(list_W,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      idp->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                idp->id = text;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // Null Callback.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              timers = idp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              timers = NULL;
                                                                                                                                                   // pressed.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char
                                                                                                                        :
                                                                                                                  (((kegsym >= XK_KP_Space) && (keysym <= XK_KP_9)) ||
((keysym >= XK_space) && (keysym <= XK_ascittilde)))) {
if ((strlen(string) + strlen(buffer)) >= INPUT_LINE_SIZE) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Callback function. Called when Operator Tool button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void widget_killer(Widget widget, XtPointer, XtPointer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmprocessTraversal(drawing_a, XmTRAVERSE_CURRENT);
if (selected_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    / temp_object_ptr_>unselect();
} // label_edit_mode != false &k ()
} // temp_object_ptr != NULL
} // ibar_mode &k label_edit_mode == false &k ()
} // strcmp KEY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Callback function. Just destroys the widget.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void op_button_cb(Widget, XtPointer, XtPointer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_object_ptr = graphic_list.over(x, y);
if (temp_object_ptr != NULL) {
   object_def = temp_object_ptr->is_a();
   if (object_def == OPERATOROBJECT ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   selected_object_ptr->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr->draw_text(SOLID);
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ibar_object_ptr = temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr->select();
                                                                                             label_edit_mode==false &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    object_def == STREAMOBJECT) {
                                                                                                                                                                                                             XBell(display_ptr, 100);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_object_ptr->erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_object_ptr->name(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                select_state (OPERATOR_TOOL);
                                                                                                                                                                                                                                                                                                       streat(string, buffer);
                                                                                                                                                                                                                                                                                                                                                                                               label_edit_mode = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtDestroyWidget(widget);
                                                                 if (ibar_mode==true &&
                                                                                                                                                                                                                                                                                                                                                                                                                          clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // pressed.
                                                                                                                                                                                                                                                                         else {
                                                                                                                                                                                                                                                                                                                                  ,-
```

```
//if (XmStringGetLtoR(strlist[0], XmFDNTLIST_DEFAULT_IAG, &text))
if (XmStringGetLtoR(strlist[0], XmSTRING_DEFAULT_CHARSET, &text))
Widget
list_w = (Widget)client_data;
AmAnyCallbackStruct *)call_data;
```

```
rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass, pane, NULL);
                                                                                    action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Callback function. Called when Informal Description Tool OK is
                                                                                                                                                                                                                                                                                                                                         / 01
                                                                                                                                                                                                                                                                                                                                                                // @1
                                                                                                                                                  pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        static void inform_tool_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                   // string = XmStringCreateLocalized("Enter or Edit Timers");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               //Set client data for "OK", "Add", "Del", and "Edit" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                               XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       list = XmCreateScrolledList(rc, "Timer_List", NULL, 0);
                                                                                                                                                                                                                                                                                                                                                                string = XmStringCreateSimple("Enter or Edit Timers");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           action_items[0].data = (XtPointer)list;
action_items[2].data = (XtPointer)list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // pressed. Added by Doug Lange 8/19/96.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    action_items[3].data = (XtPointer)list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   action_items[4].data = (XtPointer)list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       for(i = 0; i < count; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    count,
                                                                                                                                                                                                                                                                                                                                                                                                                                XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmStringFree(str[i]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNvisibleItemCount, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtManageChild(list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(list,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtManageChild(rc);
                                                                                                                                                                                                             XmNsashHeight, 1,
                                                                                                                                                                                 XmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNitemCount,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KmNitems,
                                                                                                                                                                                                                                               NULL);
NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void timers_button_cb(Widget parent,XtPointer client_data,XtPointer call_data){
                                                     //if (XmStringGetLtoR(strlist[i], XmFONTLIST_DEFAULT_IAG, &text))//@1
if (XmStringGetLtoR(strlist[i], XmSTRING_DEFAULT_CHARSET, &text))//@1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               dialog = XtVaCreatePopupShell("dialog", xmDialogShellWidgetClass, XtParent(parent), XmNtitle, "Timers Tool",
                                                                                                                                                                                                                                                                                                                                                                                                                              Callback function. Called when Timer Tool button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             10 //
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   idp = timers;
str = (XmString *) XtHalloc (count * sizeof (XmString));
                                                                                                                                                                                                                                                                                                  XtDestroyWidget(XtParent(XtParent(parent)));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               "timers_tool.hlp"}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 for (i = 0; i < count; i++) {
    // str[i] = XmStringCreateLocalized(idp->id);
                                                                                                                                                                                                                                            timers = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       timers = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget dialog, rc, pane, list, action_a; int count = 0, i, n=0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          str[i] = XmStringCreateSimple(idp->id)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        static ActionArealtem action_items[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NULL),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NULL),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             timer_tool_edit_cb, NULL},
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                timers = graphic_list.timer_list();
                                                                                                                                                                                                             graphic_list.timer_list(timers);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  timer_tool_add_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    timer_tool_ok_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ["Delete", timer_tool_del_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //Build list for list widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ("Cancel", close_dialog,
                                                                                                                                                                                                                                            id_list_release(timers);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       id_list_release(timers);
                                                                                                                                                                                                                                                                                                                                                                                                                                                          // pressed. DL 8/16/96.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Arg args[5];
AmString *str,string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ID_LIST idp, timers;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          {"Help", help_cb,
                            idp->next = NULL
idp = idp->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           idp = idp->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           idp = idp->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          args[5];
                                                                                                                   idp->id = text;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 idp = timers;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             While(idp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        {"Edit",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                {"Add",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ("OK",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               count++
```

```
action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                   //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass;
         XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                    XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static void types_tool_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                           description); n++;
                                                                                                                                                                   text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Callback function. Called when Stream Tool button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Callback function. Called when Select Tool button is
                                    XtSetArg(args[n], XmNeditable,
XtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                          true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmprocessTraversal(drawing_a, XmTRAVERSE_CURRENT);
if (selected_object_ptr != NULL) {
    selected_object_ptr->unselect();
    selected_object_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void stream_button_cb(Widget, XtPointer, XtPointer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void select_button_cb(Widget, XtPointer, XtPointer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        action_items[0].data = (XtPointer)text_u;
                                                                                                    XtSetArg(args[n], XmNwordWrap,
         XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtPopup(dialog, XtGrabNone);
                                                                                                                                     XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            select_state(SELECT_TOOL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     select_state(STREAM_TOOL);
                                                                                                                                                                                                     XtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            free (description);
                                                                                                                                                                                                                                                                        rc, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                       XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // pressed.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // pressed.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass, pane, NULL);
                                                                                                                                                                                                                                                                                                   Callback function. Called when Informal Description Tool Button is
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   string = XmStringCreateSimple("Enter or Edit Informal Description");
XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4
                                                                                                                                                                                                                                                                                                                                                                                                       static void informal_button_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            "inform_tool.hlp" }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        12); n++;
70); n++;
true); n++;
false); n++;
                                                                                                                                     XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           description = graphic_list.graph_informal_desc();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           static ActionArealtem action_items[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         {"OK", inform_tool_ok_pushed, NULL {"Cancel", close_dialog, NULL
                                                                                                                                                                                                                                                                                                                                    // pressed. Added by Doug Lange 8/19/96.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNtitle, "Informal Design Description",
XmNdeleteResponse, XmDESTROY,
char *text = XmTextGetString(text_w);
graphic_list.graph_informal_desc(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtSetArg(args[n], XmNrows,
XtSetArg(args[n], XmNcolumns,
XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                            XtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (mStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               {"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNsashWidth, 1,
XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         args[10];
                                                                                                                                                                                                        clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              n = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtParent(W),
                                                                           free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char
```

```
// XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
// Note: If you have problems with '}' symbols in the text, uncomment
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                       XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          static void spec_tool_ok_pushed(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                        description); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Widget text_w = (Widget)client_data;
XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                         true); n++;
true); n++;
                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                                                                                                                       true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                        true); n++;
                                                                                                                                                                                      12); n++;
70); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char *org_text = graphic_list.cur_op_spec();
                                                             description = graphic_list.global_types();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                         XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (strcmp(text, org_text) != 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  graphic_list.cur_op_spec(text);
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNeditMode,
XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                      XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                         XtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtManageChild(text_v);
  XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            the line above.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free (description);
                                                                                                                                                                                                                                                         XtSetArg(args[n],
                                                                                                                                                     args[10];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass, pane, NULL);
string = XmStringCreateSimple("View or Edit Prototype Types Specification");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ~~
                                                                                              XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "types_tool.hlp" }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void types_button_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                         char *org_text = graphic_list.global_types();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                   org_text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNtitle, "Prototype Types Specification",
XmNdeleteResponse, XmDESTROY,
                                                                                                                                                           char *text = XmTextGetString(text_w);
                                                             Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                 if (strcmp(text, org_text) != 0) {
    graphic_list.global_types(text);
    save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                                                     text
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNlabelString, string,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsashWidth, 1,
XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                     free(org_text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                     free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       {"Help",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtParent(w),
```

```
// XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
// Note: If you have problems with '}' symbols in the text, uncomment
// the line above.
                                                                                                                                                                                                                                                                                                                                                                                                                          action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
description); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Callback function. Called when the radio buttons in the // properties dialog box are pushed. Called twice: once to
                         text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                        //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // unselect old button, again to select the new one.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void save_indicator_cb(Widget widget, XtPointer,
                                                                                                                                                                                                                                                                                                                                                                 action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void radio_box_cb(Widget, XtPointer which,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AmToggleButtonCallbackStruct *state =
(AmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // save
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtPointer cbs) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtPointer cb_struct_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPopup(dialog, XtGrabNone);
XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  handle_file_options(0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      state_stream = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               state_stream = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (state->set) {
  if ((int) which == 0)
                                                      XtManageChild(text_v);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtManageChild(pane);
                                                                                                            rc, NULL);
                                                                                                                                                                                                                                                                               XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (psdl_modified)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ;;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass, pane, NULL);
string = XmStringCreateSimple("View or Edit Prototype Specification");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ftSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "spec_tool.hlp" }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        12); n++;
70); n++;
                                                                                                                                                                                                                         void spec_button_cb(Widget w, XtPointer client_data,
                                                                                  XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                                                                                                                                                dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                        text = NULL;
org_text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            iescription = graphic_list.cur_op_spec();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (tSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (tSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNtitle, "Prototype Specification",
XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Arg args[10];
XtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                                                                                         *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KmNlabelString, string,
                                                                                                                                                                                                                                                          XtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                {"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   AmNsashWidth, 1,
AmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                  string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         args[10];
                               free(org_text);
                                                                                                                                           clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     n = 0;
     free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtParent(W),
                                                                                                                                                                                                                                                                                                                                             XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         NULL);
                                                                                                                                                                                                                                                                                                                   Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (ULL);
                                                                                                                                                                                                                                                                                                                                                                              char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int
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XtVaSetValues(current_op_name, XmNvalue, cur_op_name, NULL);
                                                                                                                                                                                                                                                                                                                                        if ((PrintCmd.file != NULL) && (*PrintCmd.file != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            time = time_with_units(graphic_list.cur_op_spec_met(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (graphic_list.cur_op_spec_met() != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(current_op_met, XmNvalue, met, NULL);
                              sprintf(buffer, "xvd -frame -id %d | xpr -gray 2 -device ps | lpr ",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            warning(drawing_a, "A file name must be suppled.");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            cout << "Event " << message_in << endl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     cur_op_name = graphic_list.current_op_name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           graphic_list.cur_op_spec_met_unit());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             setcursor(toplevel, True, XC_left_ptr);
                                                                                                                                                                                                                                         setcursor(toplevel,True,XC_left_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                          XtWindow(toplevel), PrintCmd.file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            setcursor(toplevel,True,XC_watch);
                                                                                                                                                                     setcursor(toplevel, True, XC_watch);
                                                                                                                                                                                                                                                                                                                                                                                                        "xwd -frame -id %d > %s ",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char buffer[25] = "MET ";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (cur_op_name != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void set_current_op_met()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               strncat(met,time,20);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void set_current_op() {
                                                                                                        XtWindow(toplevel));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char *met = buffer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char *cur_op_name;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free(cur_op_name);
                                                                                                                                                                                                                                                                                                                                                                      sprintf(buffer,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              system(buffer);
                                                                                                                                                                                                    system(buffer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(time);
                                                                                                                                                                                                                                                                                                         else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                    // If graph_editor is invoked in viewer mode, this function
// handles ClientMessage events from the syntar-directed editor.
// Commented-out code handles data passed in a property, which
// this version of the editor doesn't take advantage of.
// Used during testing, and left in for future use, if necessary.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (PrintCmd.op == Snd_to_Prt) {
if ((PrintCmd.printer != NULL) &k (*PrintCmd.printer != '\0')) {
void error_indicator_cb(Widget widget, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                       report_errors(errors_present, toplevel, next_action_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "xed -frame -id %d | xpr -gray 2 -device ps | lpr -P%s ", XtWindow(toplevel), PrintGmd.printer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // 03
                                                                                                  if ((errors_present == NULL) || (!syntax_checked))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Display *display_ptr = XtDisplayOfObject(widget);
Window window = DefaultRootWindow(display_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else if (strcmp(message_in, "PrintWindow") == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XEvent* in_event, Boolean*) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          printf("graphic_list: after build\n");
graphic_list.summarize();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               strcpy(message_in, in_event->xclient.data.b);
if (strcmp(message_in, "GEDATAIN") == 0) {
                                                                                                                             handle_psdl_options(0); // check syntax
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void event_handler(Widget widget, AtPointer,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 graphic_list.build_from_sde(gdnode);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // graphic_list.build_from_disk();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XTextProperty text_prop_return;
                                                                                                                                                                                                                                      &return_sde_flag, &prev_status);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char buffer[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   graphic_list.draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Atom property_name;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char message_in[30];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int return_count;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       sprintf(buffer,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               char **data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef GE_DEBUG
```

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ftAddCallback(informal_button, XmNactivateCallback, informal_button_cb,NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNactivateCallback, select_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNactivateCallback, term_button_cb, XmNactivateCallback, stream_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNactivateCallback, timers_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNactivateCallback, types_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNactivateCallback, spec_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNactivateCallback, op_button_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaCreateManagedWidget("current_op_name", xmTextWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaCreateManagedWidget("current_op_met", xmTextWidgetClass,
                                                                                                                                                                                          main_w = XtVaCreateManagedWidget("main_w", xmFormWidgetClass,
erase_context = XCreateGC(display_ptr, root_window, gc_mask,
                                                                                                                                                                                                                                                                                                                                                  XtVaCreateManagedWidget("rowcol", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                op_button, term_button, stream_button, select_button,
                                                                                             LineOnOffDash, CapButt, JoinMiter); XSetFunction(display_ptr, dotted_context, GXxor);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KtVaSetValues(toplevel, XmNtitle, title_ptr, NULL);
                                                                   XSetLineAttributes(display_ptr, dotted_context, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             informal_button_pixmap, timers_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             stream_button_pixmap, select_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             types_button_pixmap, spec_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             op_button_pixmap, term_button_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNorientation, XmHORIZONTAL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             timers_button, informal_button.
                                   &gcv3)
                                                                                                                                                                                                                                                          build_menu_bar(main_w, menubar);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                types_button, spec_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             display_ptr, screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtAddCallback(timers_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtAddCallback(stream_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtAddCallback(select_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(types_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtAddCallback(term_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(spec_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtAddCallback(op_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                     XtManageChild(menubar);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  make_buttons(rowcol,
                                                                                                                                                                                                                                                                                                                                                                                                                  XmNnumColumns, 1,
                                                                                                                                                                                                                             toplevel, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          current_op_name =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  current_op_met =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNvalue, "",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNwidth, 150
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNvalue, "",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            main_V,
                                                                                                                                                                                                                                                                                                                                                                                           main_v,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          main_W,
                                                                                                                                                                                                                                                                                                                           roucel =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         toplevel = XtVaAppInitialize(Rapp, "edit_graph", options, XtNumber(options), &Global_argc, Global_argv,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char* args[] = ("edit_graph","-geometry","800x600",NULL);
int signed_argc = 3;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     10 //
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          resources, XtNumber(resources),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AtGetApplicationResources(toplevel, (AtPointer) &Resrcs,
                                                                      XtVaSetValues(current_op_met, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtVaSetValues(toplevel, XmNtitle, title_ptr, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    gcv1.foreground = BlackPixelOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  print_event = (XEvent *) malloc(sizeof(XEvent));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gcv3.background = WhitePixelOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gcv1.background = WhitePirelOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gcv3.foreground = WhitePixelOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gcv2.background = WhitePixelOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gcv2.foreground = BlackPixelOfScreen(screen_ptr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       root_window = RootWindowOfScreen(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            std_graphics_context = XCreateGC(display_ptr,
                                                                                                                                                                                                                       char title_str[63] = "PSDL Editor: \0";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    title_str[63] = "PSDL Editor: \0";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         NULL, NULL);
                                                                                                                                                                                                                                                                                                                                                           name_ptr = graphic_list.root_op_name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      root_window, gc_mask, &gcv1);
dotted_context = XCreateGC(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gc_mask = GCForeground | GCBackground;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       initialize_color_table(screen_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       display_ptr = XtDisplay(toplevel);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL: 0):
                                                                                                                                                                                                                                                                                                                                                                                                                        strncat(title_ptr,name_ptr,50);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          screen_ptr = XtScreen(toplevel);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    root_window, gc_mask, &gcv2);
                                                                                                                                                                                                                                                          *title_ptr = title_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *title_ptr = title_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char** argv = args;
                                                                                                                                                                void set_editor_title() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Simulated arguments
                                                                                                                                                                                                                                                                                                                                                                                        if (name_ptr != NULL)
                                                                                                                                                                                                                                                                                                *name_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void init_motif() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char
                                                                                                                                                                                                                                                                char
                                                                                                                                                                                                                                                                                                char
```

NOLL); NOLL); NOLL); NULL); NULL);

scrolled_win =	XmWheight, 8500,
XtVaCreateManagedWidget("scrolled_vin", rmScrolledWindouWidget("scrolled_vin",	XmNresizePolicy, XmNONE, NULL):
	XtAddCallback(drawing_a, XmNexposeCallback, redraw, NULL);
// XmNwidth, 1200,	
	XtVaSetValues(drawing_a, XmNunitType, XmPIXELS, NULL);
XmNscrollingPolicy, XmAUTCMATIC,	XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
XmNscrollBarDisplayPolicy, XmAS_NEEDED,	XtVaGetValues(drawing_a, XmNwidth, &width, XmNheight, &hei
NULL);	NULL);
actions.string = "draw";	drawing_area_pixmap = XCreatePixmap(display_ptr,
	root_window, width, height,
XtAppAddActions(app, &actions, 1);	DefaultDepthOfScreen(screen_ptr));
SCROLUS_INGICATOR == XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Aritimecrangie (qispiay_pur, qrawing_area_pixmap,
Actable acemanageum ruger, parus_timirarut , Amietrmiugeruinss, main u	atasa_compate, 0, 0, within margine,
rt.	XtVaSetValues(drawing_a, XmNtranslations,
XmNvalue, "",	<pre>XtParseTranslationTable(translations), NULL);</pre>
NULL);	
	XtVaSetValues(rowcol,
SAVE_LIGITORICE TO THE SAVE TH	AMNY OPPACACHMENT, AMAITACH TACH TANNY
x=DraunButtonWidestClass.	
n a in a	4
XmNrecomputeSize, false,	
XmNpushButtonEnabled, false,	NULL);
XmNshadowType, XmSHADOW_IN,	
XmNwidth, 120,	XtVaSetValues(menubar,
XmNheight, 31,	
XmNmarginBottom, 13,	
XmNlabelType, XmSTRING,	ent,
NULL);	XmNleftWidget, rowcol,
<pre>%tAddCallback(save_indicator, XmNactivateCallback, save_indicator_cb,NULl);</pre>	<pre>XmNbottomAttachment, XmATTACH_NONE, NULL);</pre>
error_indicator =	
XtVaCreateManagedWidget("error_indicator",	urre
xmDrawnButtonWidgetClass,	ent,
main_v,	
AmVrecomputeSize, false,	ent,
XmNpushButtonEnabled, false,	
AmNshadowType, AmSHADOW_IN,	ent,
AmWeidth, 120,	AmNleftwidget, rowcol,
Amhaight, 31,	AmNottomAttachment, Amailach_NUNE,
AmNmarginBottom, 13,	NULL);
AMNLEMBELLYPO, AMSIKING,	Y+VeCa+Veliac (current on met
NOLL); Frankline of Carrest tradition to the Carrest of Carrest o	Acvasorvances/currents.ppmes. Ymatorattachmest
Action indicator ch. NIII.	
	hment,
drawing_a =	
XtVaCreateManagedWidget("drawing_a",	XmNbottomAttachment, XmATTACH_NONE,
XmNunitType, Xm1000TH_INCHES,	
XmNwidth, 11000,	XtVaSetValues(scrolled_win,

```
{"", "Deleted operators will be purged?", "Ok", "No", "Cancel", BIN1};
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // The primary function, edit_graph. Modified from original main() by
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            * this method is added to support the edit graph and sde change over.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * now the edit graph module is not a standalone but a method called
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // motif_initialized assumed to be false at start of procedure
XChangeProperty(display_ptr, root_window, display_id_atom,
XA_WINDOW, 32, PropModeReplace,
(unsigned char *) &toplevel_window, 1);
XtAddEventHandler(toplevel, NoEventMask, true, event_handler,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           int edit_graph(GRAPH_DESC current_graph, ACTION next_action,
                                                                                                                                                                                                                                                                                        mapping table that allow the drawing canvas to capture
                                                                                                                                                                                                                                                           translations provides the mappings for the keyboard
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XFillRectangle(display_ptr, drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XEvent event; // added for custom main loop
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XFillRectangle(display_ptr, draw_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    graphic_list.build_from_sde(gdnode);
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             erase_context, 0, 0, width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     erase_context, 0, 0, width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = sde_error_msgs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         next_action_ptr = next_action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ERROR_MSGS sde_error_msgs)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Quest_Script delete_script =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         save_state(NOT_MODIFIED);
                                                                                                                                                                                                                                                                                                                   // mouse and keyboard events.
                                                                                                                                                                      motif_initialized = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (motif_initialized) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              return_sde_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      gdnode = current_graph;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (save_performed)
                                                                                                                                                                                                                                                                                                                                                                                                        // Doug Lange 9/9/96
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       errors_present
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          reply;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   //extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * from the sde
                                                                                                                 NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Atom display_id_atom = XInternAtom(display_ptr, "WINDOW_ID",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmProcessTraversal(drawing_a, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    toplevel_window = XtWindowOfObject(toplevel);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              graphic_list.set_draw_environ(display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                graphic_list.set_error_tgt(drawing_a);
                                                                                                                                                                         status_indicator,
                                  current_op_name,
                                                                                    XMATTACH_WIDGET,
                                                                                                                 XmNleftWidget, rowcol,
XmNbottomAttachment, XmATTACH_WIDGET,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XMATTACH_WIDGET,
     XMATTACH_WIDGET,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XMATTACH_WIDGET,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                error_indicator,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       save_indicator,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    draw_window = XtWindow(drawing_a);
                                                            XMATTACH_FORM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(status_indicator,
NtopAttachment, XmATTACH_NONE,
NrightAttachment, XmATTACH_FORM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XMATTACH_NONE,
                                                                                                                                                                                                                                                                                      XMATTACH_NONE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XMATTACH_NONE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KmNbottomAttachment, XmATTACH_FORM,
                                                                                                                                                                                                                                                                                                                   XMATTACH_NONE,
                                                                                                                                                                                                                                                                                                                                                XMATTACH_FORM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KmNbottomAttachment, XmATTACH_FORM,
                                                                                                                                                                                                                                                                                                                                                                           XmNbottomAttachment, XmATTACH_FORM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues (error_indicator,
                                                                                                                                                                                                                                                           XtVaSetValues(save_indicator,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         srase_context, dotted_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtRealizeWidget(toplevel);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     set_current_op_met();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 std_graphics_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   kdrawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNtopAttachment,
XmNrightAttachment,
                                                            XmNrightAttachment,
                                                                                                                                                                                                                                                                                                                        XmNrightAttachment,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KmNrightAttachment,
                                                                                       XmNleftAttachment,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNleftAttachment,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          set_current_op();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KmNleftAttachment,
                                                                                                                                                                                                                                                                                                                                                   XmNleftAttachment,
                                                                                                                                                                                                                                                                                        XmNtopAttachment,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KmNtopAttachment,
     KmNtopAttachment,
                                                                                                                                                                      XmNbottomWidget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           color_table,
width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KmNleftWidget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KmNleftWidget,
                               KmNtopWidget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   draw_window,
```

```
// assume need to save for abandon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  / ***********************************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else { // otherwise, will be returning, erase window and exit
                     cout << "Starting Motif event loop" << endl;
                                                                                                                                                                                                                                                                                                                 reply = AskUser(app, drawing_a, delete_script);
if (reply != YES)
                                                                                                                                               // Custom main loop to check for return to sde
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // If we are not coming back, kill the window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        --- and of graph_editor.C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if ((next_action->option != REVERT) &&
                                                                                                                                                                                                                                                                                                     (graphic_list.has_deleted()) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (next_action->option != ABANDON))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    setcursor(toplevel, True, XC_watch);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        graphic_list.write_to_sde(gdnode);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      } while (return_sde_flag == false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (!next_action_ptr->reinvoke) {
                                                                                                                                                                                                   XtAppNextEvent(app, &event);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtUnrealizeWidget(toplevel);
                                                                                                  selected_object_ptr = NULL;
                                                                                                                                                                                                                               XtDispatchEvent(&event);
                                                                                                                                                                                                                                                                                                                                                                                 return_sde_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             save_performed = false;
                                                                                                                                                                                                                                                                              if (return_sde_flag) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XFlush(display_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   //} // extern "C"
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return 0;
                                                                                                                                                                                                                                                                                                          ij
                                                 #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // syntax is checked on each entry to editor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtVaSetValues(op_button, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(op_button, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    strcpy(print_event->xclient.data.b, "PrintWindow");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          print_event->xclient.window = toplevel_window;
                                                                                                                                                                                                                                                                                                                                                                                   graphic_list.set_default_font(default_font);
                                                                                                                                                                                                                                                                                                                                                                                                               graphic_list.build_from_sde(gdnode);
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (graphic_list.cur_op_is_terminator())
                                                                                                                       graphic_list.draw();
setcursor(toplevel,True,XC_left_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     printf("\n"); //flushes the event queue
                         update_status(prev_status, false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                print_event->type = ClientMessage;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               print_event->xclient.format = 8;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PrintCmd.op = Snd_to_Prt;
PrintCmd.printer = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = dup_str("");
                                                                                                                                                                                                                                                                                                                                                       default_font = COURIERBOLD12;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // Initialize printer command
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               select_state(SELECT_TOOL);
                                                                                                                                                                                                                                                                              save_state(NOT_MODIFIED);
                                                                                                                                                                                                                                                                                                     save_performed = false;
                                                                                                                                                                                                                                                                                                                               default_color = WHITE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PrintCmd.answer = 0;
                                                                        prev_status = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  syntax_checked = true;
                                                   free (prev_status);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             graphic_list.draw();
                                                                                                                                                                                                                                                  prev_status = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            set_current_op_met();
if (prev_status) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XFlush(display_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             set_editor_title();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       set_current_op();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         PrintCmd.file
                                                                                                                                                                                                                          init_motif();
                                                                                                                                                                                                                                                                                                                                                                                                             if (gdnode) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            error_label();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // and event
```

```
static void set_draw_environ(Display *display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GraphObject();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static GC _graphics_context, _erase_context, _dotted_context; static Window _draw_window;
Size of color_table was stepping on _drawing_area_pixmap. Had to enlarge the table to MAXCULURS+1
                                                                                                                                                                                                                                          The GraphObject is the base class for the main graph objects displayed in the graph editor. It is not
                                                                                                                                                                                                                                                                                                       designed to be directly instantiated, so most of its
                                                                                                                                                                                                                                                                                                                                                                                                There are a number of static class variables used
                                                                                                                                                                                                                                                                                                                                                                                                                               to store graphic information necessary for the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Now pass units explicitly, not encoded in time.
                                                                                                                                                                                  Remarks: Specification for the GraphObject class.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static Pixmap *_drawing_area_pixmap;
static unsigned long _color_table[MAXCOLORS+1];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static Dimension window_width, window_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                          descendents to draw themselves.
                                                                                           Capt Robert M. Dixon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         static FontTable *_font_table;
static int _default_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static Display *_display_ptr;
                                                          graph_object.h
                                                                                                                                                                                                                                                                                                                                        methods are virtual.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               96/10/06 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         96/10/11 Ken Moelelr
                                                                                                                          graph_editor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static Widget _error_tgt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 include <X11/Intrinsic.b>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GraphObject *_next_ptr;
                                                                                                                                                      Date Modified: 11 Sep 92
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            define graph_object_h 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            include "font_table.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              tifndef graph_object_h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         class GraphObjectList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     include <X11/Xlib.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          tinclude "ge_defs.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 class GraphObject {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          finclude <stdio.h>
```

History:

6

Program:

Author:

virtual int text_width() {return 0;}
virtual int text_height() {return 0;}
virtual void text_locate(int, int) {} #endif; virtual BODIEAN hit_handle(int, int) {return false;}
virtual void color(COLOR) {}
virtual void set_object_font(int) {};
virtual void erase_text() {}
virtual void move_text(int, int) {}
virtual void draw_text(DRAW_STYLE) {}
virtual BODIEAN is_deleted() {return false;}
virtual void undelete_notify(CLASS_DEF, UP_ID) {}
virtual void reset_handles_drawn_state() {}

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计多数 计计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计算计	unsigned long GraphObject::_color_table[MAXCOLORS+1]; // @2
	Dimension GraphUbject::window_width;
	Dimension oraphonject::window_neight;
Program: graph_editor	
Date Modified: 11 Sep 92	GraphUbject::GraphUbject() 1
Remarks: Implementation for the GraphObject class.	_next_ptr = NULL;
	.
The GraphObject is the base class for the main graph	
objects displayed in the graph editor. It is not	// Sets up the drawing environment for the graph objects.
designed to be directly instantiated, so most of its	
methods are virtual.	void GraphObject::set_draw_environ(Display *display_ptr,
	GC graphics_context,
Credits: Portions of code are adapted from the following:	GC erase_context,
	GC dotted_context,
Baratati Naba X Window System Programming SAMS.	Window draw window,
1001	Pixman *drawing area_pixman.
	unsigned long color_table[],
Haller Des Matif Drogramming Manna Dibailly and	Dimension width.
Mariet Patt, Mott tropromises instant of motter and	Dimension height) {
ABBOCIACES, LOSI.	
	Great Obiect . dienles ntr m dienles ntr.
Applications Frogramming, his fiess, 1909.	GranhObject: graphics context = graphics context:
the state of the s	Constitution of the contract o
roung, bouglas, upject uriented frogramming with ori	Craphic jord of the contract o
and USF/Notif, Prentice-nall, 1992.	CreathOrients dred disdon a dred disdon
	Graphicolocce. Links are nivers midteding area nivers
History:	Graphory action country at on production of the production of the maximum of the country of the
	Granhlhiact: color table[i] = color table[i]:
TOTAL SOLIO VALUE TO TOTAL SOLIO	GraphObject::window width = width:
60 96/10/11 Ken Moeller	GraphObject::window_height = height;
	{
/ 由 经实验的现在分词的现在分词的现在分词的现在分词的现在分词的现在分词的现在分词的现在分词	// Initializes the font table.
The Cartain American Company of the Cartain C	
#include Cattern Control DV	woid GraphObject::font_init(Display *display_ptr) {
##1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	
*Include 'graph_object.n'	font_table = new FontTable();
// Initializars for the static class variables.	font table->init(display_ptr);
int GraphObject::_default_font = 0;	
Widget GraphObject::_error_tgt = NULL;	// Returns the width in pixels of the requested font.
// K. Moeller 8/2/96	int GraphObject::font_text_width(int font_id, char *in_string)
// sedded definitions for the class static variables	
Window GraphObject::_draw_window;	return _font_table->width(font_id, in_string);
Display *GraphObject::_display_ptr;	
GC GraphObject::_dotted_context;	
GC GraphObject::_erase_context;	// Returns the height in pixels of the requested font.
GC GraphObject::_graphics_context;	
Pixmap *GraphObject::_drawing_area_pixmap;	int GraphObject::font_text_height(int font_id) {
FontTable *GraphObject::_font_table;	

```
void draw_handles(GC draw_context, int x1, int y1, int x2, int y2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GraphObject* target_object(CLASS_DEF object_type, OP_ID id);
OP_ID request_id(CLASS_DEF class_type);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GC graphics_context, GC erase_context, GC dotted_context, Window draw_window,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dimension width, Dimension height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GraphObject* over(int x, int y); // Added 8/26/96, dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Pixmap *drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                unsigned long color_table[],
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void set_draw_environ(Display *display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CLASS_DEF is_a() {return GRAPHOBJECTLIST;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      virtual 'GraphObjectList();
GE_STATUS build_from_sde(GRAPH_DESC gd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GE_STATUS write_to_sde(GRAPH_DESC gd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void add(GraphObject *new_object_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void set_error_tgt(Widget widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GraphObject* hit(int x, int y);
                                                                                                                          GraphObject *_head_output_list;
                                                                                                                                                                                                                                                         _cur_op_spec_met_unit;
                                                                                                                                                                                                                                                                               _cur_op_is_terminator;
                                                                                                GraphObject *_head_input_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                 char* _graph_informal_desc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ID_LIST _avail_impl_langs;
                                                                                                                                                                                                                                  _cur_op_spec_met;
  int _parent_op_num;
char* _current_op_name;
                                                                                                                                                                                                                                                                                                                                     GraphObject *_head_ptr;
                                                 _current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _global_types;
                                                                                                                                                                                                                                                                                                                                                                                      ID_LIST _timer_list;
                                                                                                                                                                              char* _cur_op_spec;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 GraphObjectList();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void draw();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char*
                                                                                                                                                                                                                                                         int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _graphics_context, _erase_context, _dotted_context;
Removed un-needed routines to read and write to property.
                                                                                                                                                                                                                                                                                                                                                               of the functionality necessary to draw the graph title
                                                                                                                                                                                                                                                                                                                                       Although not currently implemented this way, most
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Removed un-needed routines to read and write to disk.
                                                                                                                                                                                                                               objects, implemented as GraphObjects. Currently,
                                                                                                                                                                                                                                                         a GraphObject may be either an OperatorObject or
                                                                                                                                                                                                      A GraphObjectList is a linked list of graphic
                                                                                                                                                    Remarks: Specification for the GraphObjectList class.
                                                                                                                                                                                                                                                                                                                                                                                           on the drawing canvas is present.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *_drawing_area_pixmap;
                                                                           Capt Robert M. Dixon
                                                 graph_object_list.h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ge_interface.h data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dimension _width, _height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #define graph_object_list_h 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _psdl_modified;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         96/10/04 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     96/10/04 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  *_display_ptr;
                                                                                                   graph_editor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              draw_window;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifndef graph_object_list_h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int _root_op_num;
char* _parent_op_name;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   include <X11/Intrinsic.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              include "stream_object.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           finclude "ge_defs.h"
finclude "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #include "ge_utilities.h"
#include "graph_object.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _error_tgt;
                                                                                                                               Date Modified: 11 Sep 92
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char* _root_op_name;
                                                                                                                                                                                                                                                                                      a StreamObject.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 class GraphObjectList {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               class GraphObject;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           protected:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           //----//
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget
BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Display
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Window
                                                                                                       Program:
                                                                             luthor:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                당
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       62
```

```
{id_list_replace(&_timer_list, x); }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void cur_op_spec(char *spec_ptr);
void global_types(char *type_ptr);
void cur_op_spec_met(int met) { _cur_op_spec_met = met; }
void cur_op_spec_met_unit(int met_u) { _cur_op_spec_met_unit = met_u; }
void cur_op_spec_met_unit(int term) { _cur_op_is_terminator = term; }
                                                                                                                                                                         char *graph_informal_desc() { return dup_str(_graph_informal_desc); }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      { _current_op_num = op_num; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      { _parent_op_num = op_num; }
                                         { return id_list_copy(_timer_list); }
                                                                                                                                                                                                                                                                                                                                                                                      // Note that copies of strings are stored, not the original string.
                                                                                                            { return dup_str(_global_types); }
                                                                                                                                                                                                                                               ID_LIST avail_impl_langs_adr() { return _avail_impl_langs; }
                                                                                                                                                                                                                                                                                                                                                                                                                         // Make sure that you free this memory when no longer required.
                                                                                                                                                                                                                                                                                                                   Methods to set values of ge_interface.h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  { _root_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void summarize_List_GraphObject(GraphObject *ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void graph_informal_desc(char *ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void current_op_name(char *ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void parent_op_name(char *ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void current_op_num(int op_num)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void parent_op_num(int op_num)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void root_op_name(char *ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void root_op_num(int op_num)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void timer_list(ID_LIST x)
                                      ID_LIST timer_list()
                                                                                                         char *global_types()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void summarize();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // Note that copies of strings are returned, not the original string.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return dup_str(_current_op_name); }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         { return dup_str(_parent_op_name); }
                                                                   void set_undeleted(CLASS_DEF class_type, OP_ID id);
void delete_notify(CLASS_DEF class_type, OP_ID deleted_obj_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return dup_str(_root_op_name); }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            { return dup_str(_cur_op_spec); }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               cur_op_spec_met_unit(){ return _cur_op_spec_met_unit; }
cur_op_is_terminator() { return _cur_op_is_terminator; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Make sure that you free this memory when no longer required.
                                                                                                                                                                                                                                                                                                                   {return GraphObject::font_name(font_id);}
roid get_del_op_list(char *del_op_str[], UP_ID del_op_id[],
                                                                                                                                                                         void move_notify(CLASS_DEF object_type, OP_ID object_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  { return _head_output_list; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  { return _head_input_list; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  { return _cur_op_spec_met; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Methods to get values of ge_interface.h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  { return _current_op_num; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void reset_psdl_modified() { _psdl_modified = false; }
BUOLEAN psdl_modified() { return _psdl_modified; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BOOLEAN fetch_matching_stream_type(StreamObject *toPtr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BOOLEAN unique_op_id(char *searchName, int VertexNum);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return _parent_op_num; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                         { _psdl_modified = true; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return _root_op_num; }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void propagate_stream(OP_ID st_id, BOOLEAN redraw);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        { return _head_ptr; }
                                      int &num_del_ops);
                                                                                                                                                                                                                                         void set_default_font(int font_id);
                                                                                                                                                                                                                                                                               char *font_name(int font_id)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      BOOLEAN *state_change);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GraphObject *output_list()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GraphObject *input_list()
                                                                                                                                                                                                                                                                                                                                                                                                                                                            void set_psdl_modified()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            cur_op_spec_met()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GraphObject *cur_graph()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char *current_op_name()
                                                                                                                                                                                                                                                                                                                                                                                         BOOLEAN has_deleted();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *parent_op_name()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               current_op_num()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               parent_op_num()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *root_op_name()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         root_op_num()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               char *cur_op_spec()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int
```

Name:	graph_object_13		***************************************
Author:			
Program:	am: graph_editor	#include <string.h></string.h>	
Date	ified:	#include <stream.h></stream.h>	
Remarks:	ks: Implementation of a GraphObjectList.	#include <sys types.h=""></sys>	
		#include <sys stat.h=""></sys>	
	A GraphObjectList is a linked list of graphic		
		#include <xm messageb.h=""></xm>	
		#include "graph object list.h"	
		#include "operator_object.h"	
Cupation	both one of code are adantal from the following.		
1	100000000000000000000000000000000000000		
	Barakati Naba Y Bindon Spetam Drogramming SANS.	#include "oe utilities debug.h"	"A"
	1991.	#include "get_unique_id.h"	ļ.
	Heller, Dan, Motif Programming Manual, O'Reilly and		
	Associates, 1991.	BOOLEAN fetch_stream_type(GraphObject *GraphList,	raphObject *GraphList,
		StreamObject *toPtr,	
	Johnson, Eric, and Reichard, Kevin, X Window	BOOLEAN *state_change);	: (e
	Applications Programming, MIS Press, 1989.		
		void inherit_stream_type(GraphObject *GraphList,	aphObject *GraphList,
	Young, Douglas, Object Oriented Programming With C++	StreamUbject *iromPtr, ROOLFAN redraw):	
	and collinears, required marks access		
Changes:			
	9/94	GraphObjectList::GraphObjectList() {	tList() {
	so that it will creates the gedatatransfile.lock file before		
	reading from the gedatatransfile.txt file and remove the	_root_op_name	= NOLL;
	gedatatransfile.lock file when the reading is completed.	_parent_op_name	= NOLL;
		_current_op_name	
	codes are also added to the store_data() routine in the	_head_input_list	= MULL;
	ge_interface.c file so that it will only write to	_head_output_list	= NULL;
	gedatatransfile.txt file if the gedatatransfile.lock	_cur_op_spec	
	does not exist in current directory.	_head_ptr	= NULL;
		_timer_list	= NULL;
Reengi	Reengineering:	_graph_informal_desc	= NULL;
Doug L	Doug Lange added build_from_sde member function on 9/10/96	_avail_impl_langs	= NULL;
		_global_types	= NULL;
History:	ıy:	display ptr	= NULL;
01	96/09/29 Ken Moeller	graphics_context	= NULL;
}	Read in streams as well as operators from sde.	_erase_context	= NULL;
		_dotted_context	= NULL;
62	96/10/04 Ken Moeller	_drawing_area_pixmap	= NULL;
	Removed un-needed routines to read and write to disk.	_draw_window	# 0;
•		_error_tgt	= NULL;
9	95/10/05 hem mostrer Removed un-needed routines to read and write to property.	_width = 0;	
		_height = 0;	
94	96/10/06 Ken Moeller	_psdl_modified = false;	

Added streams to objects written out in write_to_sde.

```
_graph_informal_desc = dup_str(gd->graph_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _timer_list = id_list_copy(gd->timer_list);
_avail_impl_langs = id_list_copy(gd->avail_impl_langs);
                                                                                                                                                                                                                                                                                                                               = dup_str(gd->cur_op_spec);
= gd->cur_op_spec_met;
= gd->cur_op_spec_met_unit;
= gd->cur_op_is_terminator;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_object_ptr = new OperatorObject(op_ptr->op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_object_ptr = new StreamObject(st_ptr->st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = dup_str(gd->global_types);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // Operators are read in; time for the streams
                                                                              _head_output_list = temp_object_ptr;
current_ptr = _head_output_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr->set_object_ptrs(this);
if(_head_ptr == NULL) {
                                                                                                                                                                                   current_ptr->link(temp_object_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 current_ptr->link(temp_object_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  current_ptr->link(temp_object_ptr);
                                                                                                                                                                                                                    current_ptr = current_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             current_ptr = current_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            current_ptr = current_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _head_ptr = temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _head_ptr = temp_object_ptr;
                                                  if(_head_output_list == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 current_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                current_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       op_ptr = gd->operator_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 st_ptr = gd->stream_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(_head_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       st_ptr = st_ptr->next;
st_ptr = st_ptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_ptr = op_ptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             while (st_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      while(op_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                      _cur_op_spec_met_unit
                                                                                                                                                                                                                                                                                                                                                                                                                  _cur_op_is_terminator
                                                                                                                                                                                                                                                                                                                                                                _cur_op_spec_met
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _global_types
                                                                                                                                                                                                                                                                                                                                      _cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                      GE_STATUS GraphObjectList::build_from_sde(GRAPH_DESC gd) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_object_ptr = new StreamObject(st_ptr->st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_object_ptr = new StreamObject(st_ptr->st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _current_op_name = dup_str(gd->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _parent_op_name = dup_str(gd->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = dup_str(gd->root_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                            GraphObject *temp_object_ptr, *current_ptr;
                                                                                                                                                          printf("GraphObjectList Destructor\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = _head_input_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _head_input_list = temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   current_ptr->link(temp_object_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            current_ptr = current_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _current_op_num = gd->current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _parent_op_num = gd->parent_op_num;
                                                                         GraphObjectList:: "GraphObjectList() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = gd->root_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_head_input_list == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       status = SUCCEEDED;
                                                                                                                                                                                                                                                                                                                                                                                                                  *error_str_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           st_ptr = gd->output_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         st_ptr = gd->input_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          st_ptr = st_ptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  while (st_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while (st_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              error_str_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      op_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      id_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  st_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         current_ptr
                                                                                                                            #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _root_op_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _root_op_num
                                                                                                                                                                                                                                              release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GE_STATUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OP_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ST_LIST
                                                                                                                                                                                      #endif
```

```
// the operators, then the streams. This is so that the operators // will exist in memory when the stream from and to pointers are assigned
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // Build the operator and stream lists in two passes, first to get
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       op_list->next = (OP_LIST) malloc(sizeof(OP_LIST_NODE)); // kbm
                                                                                                                st_list->next = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // kbm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      st_list->next = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
if (st_list == NULL ) {
    st_list = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
                                                                                                                                                                                                                                                                                                                                   = _cur_op_spec_met_unit;
                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(_cur_op_spec);
                                                                                                                                                                                                                                                                                                                                                                                                                                 = _cur_op_is_terminator;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // 64
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 op_list->op = ((OperatorObject *) go)->clone();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                st_list = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
                                                                                                                                                                                                                                                                                                             = _cur_op_spec_met;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (go->is_a() == STREANDBJECT) {
                                                                                                                                                                                      st_list->st = stPtr->clone(NULL);
                                           gd->output_list = st_list;
                                                                                                                                           st_list = st_list->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (st_list == NULL ) {
                                                                                                                                                                                                                                                                                                                                   gd->cur_op_spec_met_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                 gd->cur_op_is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         op_list->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          gd->stream_list = st_list;
                                                                                                                                                                                                                st_list->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     op_list = op_list->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        st_list = st_list->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             while (go != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             while (go != NULL) {
                                                                                                                                                                                                                                                                                                                gd->cur_op_spec_met
                                                                                                                                                                                                                                        go = go->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    go = go->next();
                                                                                                                                                                                                                                                                                                                                                                                       gd->cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               go = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    go = _head_ptr;
op_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            st_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         op_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else {
                                                                                               else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              st_list->next = (ST_LIST) malloc(sizeof(ST_LIST_MODE));
                                                                                                                                                                     //Written by Doug Lange; modified by Ken Moeller GE_STATUS GraphObjectList::write_to_sde(GRAPH_DESC gd) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (st_list == NULL ) {
   st_list = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            gd->current_op_name = dup_str(_current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           gd->parent_op_name = dup_str(_parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      gd->root_op_name = dup_str(_root_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       gd->current_op_num = _current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   gd->parent_op_num = _parent_op_num;
                                                                         // 01
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    st_list->st = stPtr->clone(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = _root_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         while (go != NULL) {
stptr = (StreamObject *) go;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                while (go != NULL) {
stPtr = (StreamObject *) go;
                                                                                                                                                                                                                                                                                                         op_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         gd->input_list = st_list;
                                                                                                                                                                                                                                                                                                                                       = NULL;
                                                                                                                                                                                                                                                                                          = NULL;
                                                                                                                                                                                                                                                                                                                                                               st_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      st_list = st_list->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     go = _head_output_list;
st_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                go = _head_input_list;
st_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           st_list->next = NULL;
                            _psdl_modified = false;
                                                                                                                                                                                                                                                                  StreamObject *stPtr;
                                                                       return(SUCCEEDED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 go = go->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          graph_release(gd);
                                                                                                                                                                                                                                            GraphObject *go;
                                                                                                                                                                                                                                                                                              ģ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  gd->root_op_num
                                                                                                                                                                                                                                                                                                                                                                                                               = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                 go = NULL;
stPtr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else {
                                                                                                                                                                                                                                                                                            OPERATOR
                                                                                                                                                                                                                                                                                                                    OP LIST
                                                                                                                                                                                                                                                                                                                                                                  ST_LIST
                                                                                                                                                                                                                                                                                                                                            STREAM
```

// kbm

```
CLASS_DEF object_type, OP_ID id) {
                                                                      // If the given coordinates are located inside one of the
// graph objects or their text strings, the function returns
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        warning(_error_tgt,"Requested operator id not found"); return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GraphObject* GraphObjectList::over(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 설
                                                                                                                                                                                                                 GraphObject* GraphObjectList::hit(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if((temp_object_ptr->is_a() == object_type)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // Returns a pointer to the requested object.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         GraphObject* GraphObjectList::target_object(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (temp_object_ptr->id() == id)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(temp_object_ptr->over(x, y))
                                                                                                                                                                                                                                                                                                                                                                                        while(temp_object_ptr != NULL) {
  if(temp_object_ptr->hit(x, y))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              while(temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while(temp_object_ptr != NULL)
      void GraphObjectList::erase() {}
                                                                                                                                                                                                                                                 GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GraphObject* temp_object_ptr;
                                                                                                                                                                                                                                                                                                                        temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return (GraphObject *) NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return (GraphObject *) NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              return temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return temp_object_ptr;
                                                                                                                                             // a pointer to the object.
st_list->st = ((StreamObject *) go)->clone(gd->operator_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XFillRectangle (_display_ptr, _draw_window, _erase_context, 0,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Streams are drawn first to prevent the operators' handles
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           from overwriting the arrowheads. Handles are drawn in xor
                                                                                                                                                                                                                                          = id_list_copy(_avail_impl_langs);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Since handles are drawn in xor mode, it's important to
                                                                                                                                                                                                                                                                                                              gd->graph_informal_desc = dup_str(_graph_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // track whether they've been drawn or not. Redrawing the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _erase_context, 0, 0, width, height);
                                                                                                                                                                                                          = id_list_copy(_timer_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Draws the GraphObjectList to the drawing canvas.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          O, _width, _height);
XFillRectangle(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                 = dup_str(_global_types);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_object_ptr = _head_ptr;
while(temp_object_ptr != NULL) {
   if(temp_object_ptr->is_a() == OPERATOROBJECT) {
      temp_object_ptr->reset_handles_drawn_state();
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr->reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(temp_object_ptr->is_a() == STREAMOBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // handles unintentionally erases them.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // mode so they will erase properly.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_object_ptr->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         while(temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void GraphObjectList::draw() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_object_ptr = _head_ptr;
                                   st_list->next = NULL;
                                                                                                                                                                                                                                              gd->avail_impl_langs
                                                                                                          go = go->next();
                                                                                                                                                                                                                                                                                                                                                                                                                        return SUCCEEDED;
                                                                                                                                                                                                                                                                                                                                                 gd->global_types
                                                                                                                                                                                                          gd->timer_list
```

Notifies all the objects that one of them has been

```
= graphics_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GraphObject::set_default_font(font_id);
                                                                                                                                                                                 = dotted_context;
                                                                                                                                                  = erase_context;
                                                                                                                                                                                                                                                                                                                                                                                                                               GraphObject::font_init(_display_ptr);
                                                                                                                                                                                                              = draw_window;
                                                                                    = display_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   while(temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Draws a handle on the graph.
                                                                                                                                                                                                                                                                                                        = height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                            = width:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            HANDLESIZE):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Sets the default font.
                                                                                                                _graphics_context
                                                                                                                                                                               _dotted_context
                                                                                                                                                     _erase_context
                                                                                                                                                                                                              draw_window
                                                                                                                                                                                                                                                                            vidth
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_object_ptr->delete_notify(class_type, deleted_obj_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void GraphObjectList::set_draw_environ(Display *display_ptr,
                                                                                                                OP_ID deleted_obj_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sets the necessary drawing variables, and performs the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP_ID GraphObjectList::request_id(CLASS_DEF class_type) {
                                                                                       void GraphObjectList::delete_notify(CLASS_DEF class_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void GraphObjectList::add(GraphObject *new_object_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          * Obtain the next available unique id from the server.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GC graphics_context, GC erase_context, GC dotted_context, Window draw_window,
// Notifies all the objects that one of them has been
// deleted, so that they may take appropriate actions.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  while(temp_object_ptr->next() != NULL)
temp_object_ptr = temp_object_ptr->next();
temp_object_ptr->link(new_object_ptr);
                                                                                                                                                                                                                                                                                                                                 temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // same operation for the GraphObject class.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Adds a new GraphObject to the list.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _head_ptr->link(new_object_ptr);
                                                                                                                                                                                                                                                                            while(temp_object_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(_head_ptr->next() == NULL)
                                                                                                                                                  GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GraphObject *temp_object_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _head_ptr = new_object_ptr;
                                                                                                                                                                                                              temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_object_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         id = get_unique_id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(_head_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OP_ID id;
```

```
GraphObject::set_draw_environ(_display_ptr, _graphics_context,
    _erase_context, _dotted_context, _draw_window,
    _drawing_area_pixmap, color_table, width, height);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XFillRectangle(_display_ptr, _draw_window, draw_context,
x2 - HANDLESIZE, y1, HANDLESIZE);
                                 unsigned long color_table[], Dimension width,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XFillRectangle(_display_ptr, _draw_window, draw_context, x1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XFillRectangle(_display_ptr, _draw_window, draw_context, x1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XFillRectangle(_display_ptr, _draw_window, draw_context, x2 - HANDLESIZE, y2 - HANDLESIZE, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int y1, int x2, int y2) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void GraphObjectList::draw_handles(GC draw_context, int x1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            y2 - HANDLESIZE, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Notifies the objects that one of them has been moved.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_object_ptr->move_notify(object_type, object_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void GraphObjectList::move_notify(CLASS_DEF object_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void GraphObjectList::set_default_font(int font_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OP_ID object_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_object_ptr = temp_object_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         y1, HANDLESIZE, HANDLESIZE);
Pixmap *drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                   _drawing_area_pixmap = drawing_area_pixmap;
                                                                               Dimension height) {
```

```
void GraphObjectList::graph_informal_desc(char *ptr) {
void GraphObjectList::set_error_tgt(Widget widget) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void GraphObjectList::global_types(char *type_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void GraphObjectList::cur_op_spec(char *spec_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void GraphObjectList::current_op_name(char *ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           roid GraphObjectList::parent_op_name(char *ptr) {
                                                                                                                                                                                                                                                                                               void GraphObjectList::root_op_name(char *ptr) {
                                                                                              GraphObject::set_error_tgt(widget);
SplineObject::set_error_tgt(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _graph_informal_desc = dup_str(ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _global_types = dup_str(type_ptr);
                                                                                                                                                               FontTable::set_error_tgt(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _cur_op_spec = dup_str(spec_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _current_op_name = dup_str(ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void GraphObjectList::release() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _parent_op_name = dup_str(ptr);
                                                                                                                                                                                                                                                                                                                                                                                                 _root_op_name = dup_str(ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(_graph_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              free(_current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free(_parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                   free(_root_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                free(_global_types);
                                                                   _error_tgt = widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(_cur_op_spec);
                                                                                                                                                                                                                                                              XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x2 - HANDLESIZE, y2 - HANDLESIZE,
HANDLESIZE, HANDLESIZE);
   XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y1, HANDLESIZE, HANDLESIZE);
                                                                                                                                                               XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y2 - HANDLESIZE, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               while((temp_obj_ptr != NULL) && (index < MAXDELETEDUPS)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              del_op_str[index] = dup_str(temp_obj_ptr->name());
del_op_id[index] = temp_obj_ptr->id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Sets the widget used to display the error message box.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           int &num_del_ops) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void GraphObjectList::set_undeleted(CLASS_DEF class_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // Notifies the objects that the given object has been
                                                             XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x2 - HANDLESIZE, y1,
HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if((temp_obj_ptr->is_a() == OPERATOROBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_obj_ptr->undelete_notify(class_type, id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     OP_ID id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_obj_ptr = temp_obj_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_obj_ptr = temp_obj_ptr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // Makes a list of deleted operators.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (temp_obj_ptr->is_deleted())) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       while(temp_obj_ptr != NULL) {
                                                                                                                                                                                                                                     HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GraphObject *temp_obj_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GraphObject *temp_obj_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_obj_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_obj_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  num_del_ops = index;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     index++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int index = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      undeleted.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        :
```

```
printf(" prent_op_name: \"%s\"\n",_prent_op_name);
printf(" current_op_name: \"%s\"\n",_current_op_name);
printf(" graph_informal_desc: \"%s\"\n", _graph_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Stream ID %d %s\n", tempST->id(), name);
                                                                                                                                                                                                                                                                                                                                                                          \"%s\"\n",_root_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (_timer_list) summarize_ID_LIST(_timer_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   summarize_List_GraphObject(_head_output_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       summarize_List_GraphObject(_head_input_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               while (tmpPtr) {
   if ((tmpPtr->is_a() == OPERATOROBJECT) &&
   ((OperatorObject *) tmpPtr)->is_deleted()))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     printf("\n OPERATOR/STREAM LIST: %s\n",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  summarize_List_GraphObject(_head_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN GraphObjectList::has_deleted() {
                                                                                                                                                                                                                                                                                                                               printf("GraphObjectList Summary:\n");
                                               tempST = (StreamObject *) temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                printf("\n OUTPUT LIST: %s\n",
(_head_output_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  printf("End of GraphObjectList\n");
                                                                                                                                                                                                                                                                             void GraphObjectList::summarize() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   printf("\n TIMER LIST: %s\n",
(_timer_list) ? "" : "NULL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (_head_ptr) ? "" : "NULL");
                                                                      name = tempST->name();
                                                                                                                                                                                                                                                                                                                                                                            printf(" root_op_name:
                                                                                                                                                                           temp = temp->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GraphObject *tmpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    tmpPtr = _head_ptr;
                                                                                                                        free(name);
                                                                                               printf("
                         else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void GraphObjectList::summarize_List_GraphObject(GraphObject *ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Operator ID %d %s\n", tempOP->id(), name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (temp->is_a() == OPERATOROBJECT) {
  tempOP = (OperatorObject *) temp;
                           printf("GraphObjectList::release\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     id_list_release(_avail_impl_langs);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   id_list_release(_timer_list);
_timer_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _graph_informal_desc = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            free (_graph_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             name = tempOP->name();
printf(" Operator II
                                                                                                                                                                                                                                                                                                                                                                               avail_impl_langs = NULL;
                                                                                                                                                                                                                                                                                                                               delete _head_input_list;
                                                                                                                                                                                                                                                                                                                                                      .head_input_list = NULL;
                                                                                                                                                                                                                                                                          _current_op_name = NULL;
                                                                                                                                                                                                                                                      free(_current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OperatorObject *tempOP;
                                                                                                                                                                                                 _parent_op_name = NULL;
                                                                                                                                                                           free (_parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             while (temp != NULL) {
                                                                                                    free(_root_op_name);
_root_op_name = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _global_types = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           StreamObject *tempST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _cur_op_spec = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free(_global_types);
                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(_cur_op_spec);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GraphObject *temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 delete _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _head_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free (name);
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp = ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char *name;
                                                    #endif
```

```
BOOLEAN GraphObjectList::unique_op_id(char *searchName, int VertexNum) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void GraphObjectList::propagate_stream(OP_ID st_id, BOOLEAN redray) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // Create a pointer to stream from which we will propagate
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        inherit_stream_type(_head_ptr,
inherit_stream_type(_head_input_list, fromPtr, false);
inherit_stream_type(_head_output_list, fromPtr, false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if ((tmpPtr->is_a() == OPERATOROBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (((StreamObject *) tmpPtr)->id() == st_id)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (strcmp(opName, searchName) == 0) {
                                                                                                                                                                                                                                                                                                                                                                               // Search through all of the current graph
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if ((tmpPtr->is_a() == STREAMOBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          fromPtr = (StreamObject *) tmpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        break; // jump out of loop
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    tmpPtr = tmpPtr->next();
                                                      tmpPtr = tmpPtr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tmpPtr = tmpPtr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StreamObject *fromPtr;
                                                                                                                                                                                                                                                                                             GraphObject *tmpPtr;
                                                                                                                                                                                                                                                                                                                           *opName;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GraphObject *tmpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           tmpPtr = _head_ptr;;
                                                                                                                                                                                                                                                                                                                                                                                                                   tmpPtr = _head_ptr;
                                                                                                               free (searchName);
free(stName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free (obName);
                                                                                                                                                                                                                                                                                                                                                                                                                                           while (tmpPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      while (tmpPtr) .
                                                                                                                                          return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free (opName);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return false;
                                                                                                                                                                                                                                                             BOOLEAN GraphObjectList::fetch_matching_stream_type(StreamObject *toPtr,
                                                                                                                                                                                                                                                                                                                                                                                                          fetch_stream_type(_head_ptr, toPtr, state_change) ||
fetch_stream_type(_head_input_list, toPtr, state_change) ||
fetch_stream_type(_head_output_list, toPtr, state_change);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (stPtr->is_state_variable() != toPtr->is_state_variable())
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Now search the GraphList for the first matching stream
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         BUOLEAN fetch_stream_type(GraphObject *GraphList,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (((StreamUbject *) tmpPtr)->id() != searchID)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (stromp(stName, searchName) == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if ((tmpPtr->is_a() == STREAMOBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // grab the name and check for match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               stPtr = (StreamObject *) tmpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                return fetch_stream_type(_head_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // We need the name to compare with
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *searchName, *stName;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *state_change) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         stName = stPtr->name();
                                                                                                                                                                                                                                                                                             BOOLEAN *state_change) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       searchName = toPtr->name();
                                                      tmpPtr = tmpPtr->next();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    toPtr->inherit_type(stPtr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     searchID = toPtr->id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              searchID;
                                                                                                                                                                                                                                                                                                                                                       *state_change = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GraphObject *tmpPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *state_change = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          StreamObject *stPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       StreamObject *toPtr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             tmpPtr = GraphList;
return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        while (tmpPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                free(stName);
free(searchName);
                                                                                                                                          return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OP_ID
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4
```

```
stName = stPtr->name();

if (strcmp(stName, fromName) == 0) {
  old_state_value = stPtr->is_state_variable();
  if (redraw && (fromPtr->is_state_variable() != old_state_value))
    stPtr->arase();
  stPtr->inharit_type(fromPtr);
  if (redraw && (fromPtr->is_state_variable() != old_state_value))
  if (redraw && (fromPtr->is_state_variable() != old_state_value))
  }
  free(stName);
}

tmpPtr = tmpPtr->next();
}
free(fromName);
}
```

// grab the name and check for match

```
BOOLEAN readGraphDesc(GRAPH_DESC graph, XferBuffer *xfer, int Chl); BOOLEAN writeGraphDesc(GRAPH_DESC graph, XferBuffer *xfor, int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BOOLEAN writeAction(ACTION next_action, XferBuffer *xfer, int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BOOLEAN readErrorHsgs(ERROR_MSGS *errs, XferBuffer *xfer, int Chl);
BOOLEAN writeErrorHsgs(ERROR_MSGS errs, XferBuffer *xfer, int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      BUDLEAN readAction(ACTION next_action, XferBuffer *xfer, int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               unpackGraphNames(GRAPH_DESC graph, MferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN packGraphNames(GRAPH_DESC graph, MferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BOOLEAN xfer_space_avail(XferBuffer *xfer, int delta);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SOOLEAN packID_LIST(ID_LIST idList, MferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN packInteger(int inInt, XferBuffer *xfer);
BOOLEAN packBoolean(BOOLEAN Bool, XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN packString(char* str, XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                             BOOLEAN enlarge_rfer_buf(XferBuffer *xfer);
BOOLEAN collapse_xfer_buf(XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN readChkWord(int *chkWord, int Chl);
BOOLEAN writeChkWord(int chkWord, int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                   create_xfer_buf(XferBuffer **xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int write_xfer(int Chl, XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int read_xfer(int Chl, XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int unpackInteger(XferBuffer *xfer); BOOLEAN unpackBoolean(XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ID_LIST unpackID_LIST(XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char* unpackString(XferBuffer *xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BOOLEAN synch_write(int Chl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BUDLEAN synch_read(int Chl);
                                                                                                                                                                                            BOOLEAN writeGraphDesc();
                                                                                                                                                                                                                                                                             BOOLEAN writeErrorMsgs();
                                                                                                                                                               BOOLEAN readGraphDesc();
                                                                                                                                                                                                                                                      BOOLEAN readErrorMsgs();
                            BOOLEAN synch_write();
                                                                                                           BOOLEAN writeAction();
                                                                                 BOOLEAN readAction();
BOOLEAN synch_read();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef __cplusplus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                            #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void
                                                                                                                                                                                                                                                                                                                                                                                                      void
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /* static variables for inter-process communication */
                            #define inter_process_utilities_h 1
#ifndef inter_process_utilities_h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        sde_to_ge_channel[2],
ge_to_sde_channel[2];
                                                                                                                                                                                                                                                                                                                                                                         typedef struct xfer_buffer {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BOOLEAN enlarge_xfer_buf();
BOOLEAN collapse_xfer_buf();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN xfer_space_avail();
                                                                                                                                                                  OXFACE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       unpackGraphNames();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         create_xfer_buf();
                                                                                 #include "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN packGraphNames();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BUULEAN unpackBoolean();
ID_LIST unpackID_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               unpackInteger();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN readChkWord();
BOOLEAN writeChkWord();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  unpackString();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN packInteger();
BOOLEAN packBoolean();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN packID_LIST();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              write_xfer();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN packString();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 read_xfer();
                                                                                                                                                                                                                                                      #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #ifdef _NO_PROTO
                                                                                                                                                               #define CHKWORD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          } XferBuffer;
                                                                                                                                                                                                                                                                                                                                                                                                      char *Buf;
                                                                                                                                                                                                                                                                                                                                                                                                                                   Idx;
                                                                                                                                                                                                                                                                                                                                                                                                                                                             Max;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XferBuffer
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char*
                                                                                                                                                                                                                                                                                                               #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                   int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Piov
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int
```

endif

```
while ((too_small = ((xfer->Idx + delta) > (xfer->Max))) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN xfer_space_avail(XferBuf *xfer, int delta) {
                                                                                                                                                                                                                                                                                                                                                        BOOLEAN collapse_xfer_buf(XferBuffer *xfer) {
                                                                       printf("Error in enlarge_xfer_buf\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("Error in enlarge_xfer_buf\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (too_small)
printf("Error in xfer_space_avail\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                 xfer->Idx = 0;
xfer->Hax = INIT_XFER_BUF;
xfer->Buf = (char *) malloc(xfer->Max);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #ifdef _NO_PROTO
BOOLEAN xfer_space_avail(xfer, delta)
                                                                                                                                                                                                                                    #ifdef _NO_PROTO
BOOLEAN collapse_xfer_buf(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            enlarge_xfer_buf(xfer))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (xfer->Buf != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN too_small;
                                                                                                                                                                                                                                                                                                                                                                                                                           free(xfer->Buf);
                                                                                                                    return false;
                                                                                                                                                                                                                                                                                     XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return true;
                       alse {
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* Allocate space for the XferBuffer */
Temp = (XferBuffer *) malloc(sizeof(XferBuffer));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* Now allocate the buffer and initialize */
Temp->Buf = (char *) malloc(INIT_XFER_BUF);
Temp->Max = INIT_XFER_BUF;
Temp->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (Temp = (char *) malloc(2*(xfer->Max))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BOOLEAN enlarge_xfer_buf(XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                         void create_xfer_buf(XferBuffer **xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 memcpy(Temp, xfer->Buf, xfer->Max);
#include <string.h>
#include <memory.h>
#include "inter_process_utilities.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              xfer->Buf = Temp;
xfer->Max = 2*(xfer->Max);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef _NO_PROTO
BOOLEAN enlarge_xfer_buf(xfer)
                                                                                                                                                                                                                                                                                                                                   void create_xfer_buf(xfer)
                                                                    #include "ge_utilities.h"
                                                                                                                                                                                                                                    #define INIT_XFER_BUF 256
#define MAX_PACKET 4096
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *Temp->Buf = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(xfer->Buf);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                MerBuffer *Temp;
                                                                                                                                                                                                                                                                                                                                                          XferBuffer **xfer;
                                                                                                                                         #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                           #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *xfer = Temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *Temp;
                                                                                                                                                                                         #endif
```

```
actual_size = read(Chl, packet_ptr, xfer_size);
if (actual_size != xfer_size) {
    printf("ERROR: read_xfer not able to receive buffer (packet %d).\n",
    packetIdx);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              printf("write_rfer %d bytes using %d packets...", buf_size, num_packets);
                                            /* We may have changed the location of buffer, get new buffer_ptr */
packet_ptr = (xfer->Buf) + (MAX_PACKET * (packetldx-1));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* whole packets
/* plus any partial buffer */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /* Calculate how many packets will be required to send buffer */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /* first we need to tell receiver how many packets to expect */
                                                                                                                                                                                                                                                                                                                                                                /* How many bytes so far */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                printf(" SUCCESSFUL (%d bytes).\n", tot_size);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int write_xfer(int Chl, XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    num_packets = buf_size / MAX_PACKET;
if (buf_size % MAX_PACKET != 0)
                                                                                                                                                                                                                                                                                                                                                              tot_size += actual_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int_size, actual_size;
                                                                                                                                     /* Now read in the data */
                                                                                                                                                                                                                                                                                                                                         xfer->Idx += actual_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #ifdef _NO_PROTO
int write_xfer(Chl, xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     cur_packet_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          xfer->Idx = tot_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          buf_size = xfer->Idx;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    num_packets;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char *packet_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return tot_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           packet Idx;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                num_packets++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 buf_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CF1:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                  return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Hendif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /* Data is sent in a size, data pair */
actual_size = read(Ch1, &rfer_size, int_size);
if (actual_size != int_size) {
   printf("ERROR: read_xfer not able to receive buffer (packet size).\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             printf("ERROR: read_rfer not able to transfer buffer (num_packets).\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            xfer_status = xfer_space_avail(xfer, xfer_size);
if (!xfer_status) {
   printf("ERROR: read_xfer not able to allocate sufficient memory.\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* Clear to get accurate xfer_space_avail */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for (packetIdx = 1; packetIdx <= num_packets; packetIdx++) {</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /* First determine how many packets will be required */
                                                                                                                                                                                                                                                                                                                                                                                                                                               int_size, rfer_size, actual_size, tot_size; num_packets; packetldr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* Make sure we have room to place the packet */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           actual_size = read(Chl, &num_packets, int_size);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             printf("read_xfer %d packets...", num_packets);
                                                                                                                                                                                                                                                                                                                                         int read_xfer(int Chl, XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (actual_size != int_size) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int_size = sizeof(int);
                                                                                                                                                                                              int read_xfer(Chl, xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                 xfer_status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *packet_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* Next get data */
                                                      return (too_small;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                xfer->Idx = 0;
                                                                                                                                                                                                                                                          XferBuffer *xfer;
                                                                                                                                                                    #ifdef _NO_PROTO
                                                                                                                                                                                                                                G.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             tot_size = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #endif
#endif
                                                                                                                                                                                                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                                                                                    #else
```

```
/* If null, we still need something to occupy space */
                                                                                                                                                                                                                                                                                                                                                                                                                                            strcpy((char*) &(xfer->Buf[xfer->Idx]), blank_line);
xfer->Idx += delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (xfer_space_avail(xfer, delta)) {
    memcpy((char*)k(xfer->Buf[xfer->Idx]), &inInt, delta);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BUOLEAN packInteger (int inInt, MferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                     if (xfer_space_avail(xfer, delta)) {
                                                                                                                                                                   printf("Error in packString\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   printf("Error in packString\n");
#endif
                                                                                                                                                                                                                                                                                                                                                              delta = strlen(blank_line) + 1;
                                                                                                                                                                                                                                                                                                                                     char* blank_line = strdup("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN packInteger(inInt, rfer)
       xfer->Idx += delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(blank_line);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free(blank_line);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     zfer->Idz += delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            delta = sizeof(int);
                                                                                                                                                                                                                           return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return false;
                                                            return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              MferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return true;
                                                                                                                                        #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int delta;
                                                                                                            else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else {
                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int inInt;
                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                            actual_size = write(Chl, &cur_packet_size, int_size); /* first size */
if (actual_size != int_size) {
   printf("ERROR: write_zfer not able to transfer buffer (packet size).\n");
actual_size = urite(Chl, &num_packets, int_size);
if (actual_size != int_size) {
   printf("ERROR: write_xfer not able to transfer buffer (num_packets).\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           actual_size = urite(Chl, packet_ptr, cur_packet_size); /* next data */
if (actual_size != cur_packet_size) {
   printf("ERROR: urite_xfer not able to transfer buffer (packet %d).\n",
                                                                                                                                                                                                                   for (packetidx = 1; packetidx <= num_packets; packetidx++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (xfer_space_avail(xfer, delta)) {
   stropy((char *) &(xfer->Buf[xfer->Idx]), str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN packString(char* str, XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                    cur_packet_size = buf_size % MAX_PACKET;
                                                                                                                                                                   /* Now send each packet to receiver */
                                                                                                                                                                                                                                                                                                                                                                                                                   /* Data sent in a size, data pair */
                                                                                                                                                                                                                                                                                                                                                              cur_packet_size = MAX_PACKET;
                                                                                                                                                                                                                                                                             if (packetIdx == num_packets)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 packet_ptr += MAX_PACKET;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN packString(str, xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               delta = strlen(str) + 1;
                                                                                                                                                                                             packet_ptr = xfer->Buf;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("SUCCESSFUL\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (str != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return buf_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              packetIdx);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return 0;
                                                                                return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char* str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #endif
```

```
if (!packed)
printf("Etror in packSpline\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = "}Spline";
                                                                                                                                                                                                                                                                                                                      BOOLEAN packSpline(splist, xfer)
SPLINE_PTR splist;
              IDptr = IDptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SPptr = SPptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SPLINE_PTR SPptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            packed = true;
SPptr = spList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN packed;
                                                                                                                                                                                                                                                                                                                                                            XferBuffer *xfer;
                                                                                                                                                                                              return packed;
                                                                                                                                                                                                                                                                                                       #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return packed;
                                                                                                      #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char *Spline
                                                                                                                                                          #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                 #else
                                                                                                                                                                                                                                                                                                                                                          if (xfer_space_avail(xfer, delta)) {
    memcpy((char*)&(xfer->Buf[xfer->Idx]), &Bool, delta);
    xfer->Idx += delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BOOLEAN packID_LIST(ID_LIST idList, MferBuffer *xfer) {
                                                                                                                                                                                                                                                     BOOLEAN packBoolean(BOOLEAN Bool, XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while ((IDptr != NULL) && packed) {
  packed &= packString(IDptr->id, xfer);
printf("Error in packInteger\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("Error in packBoolean\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char *End_of_List = "}End_of_List";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN packID_LIST(idList, rfer)
ID_LIST idList;
                                                                                                                                                          BOOLEAN packBoolean(Bool, xfer)
BOOLEAN Bool;
                                                                                                                                                                                                                                                                                                                        delta = sizeof(BOOLEAN);
                                       return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IDptr = idList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KferBuffer *xfer;
                                                                                                                                                                                                XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ID_LIST IDptr;
BUOLEAN packed;
                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                   return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                        int delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                       #endif
                                                                                                                                                                                                                                     #0186
                                                                                                                                                                                                                                                                                                                                                                                                                                                       291
```

```
/* Need a string at head to */
/* check for end of spline */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BOOLEAN packSpline(SPLINE_PTR spList, MferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           packed &= packString(End_of_Spline, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                packed k= packString(Spline, xfer);
packed k= packInteger(Spptr->x, xfer);
packed k= packInteger(Spptr->y, xfer);
packed &= packString(End_of_List, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char *End_of_Spline = "}End_of_Spline";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       while ((SPptr != NULL) && packed) {
                                                                                                 if (!packed)
printf("Error in packID_LIST\n");
```

```
memcpy((char*)&temp, (char*)&(xfer->Buf[xfer->Idx]), delta);
xfer->Idx += delta;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /* Recover the End_of_List marker */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         else {
   IDptr->next = (ID_LIIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (strcmp(Id, (char*) End_of_List) == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (IDhead == NULL) {
    IDptr = (ID_LIST) malloc(sizeof(ID_NUDE));
    IDhead = IDptr;
                                                                                                                                                                                                                                                                                          ID_LIST unpackID_LIST(XferBuffer *xfer) {
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                char *End_of_List = "}End_of_List";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef _NO_PROTO
SPLINE_PTR unpackSpline(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Id = unpackString(xfer);
                                                                                                                                                                                   #ifdef _NO_PROTO
ID_LIST unpackID_LIST(xfer)
XferBuffer *xfer;
delta = sizeof(BOOLEAN);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               IDptr->id = Id;
IDptr->next = NULL;
                                                                                                                                                                                                                                                                                                                                                            BUOLEAN contLoop;
ID_LIST IDptr, IDhead;
char *Id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           contloop = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       while (contLoop) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IDptr = IDptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           contLoop = true;
IDhead = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return IDhead;
                                                                                                     return temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free(Id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else {
                                                                                                                                                                                                                                                                            #0150
                                                                                                                                                                                                                                                     temp = (char*) malloc(strlen((char*)&(xfer->Buf[xfer->Idx]))+1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           memcpy((char*)&temp, (char*)&(xfer->Buf[xfer->Idx]), delta);
xfer->Idx += delta;
                                                                                                                                                                                                                                                                                              strcpy(temp, (char*)&(xfer->Buf[xfer->Idx]));
xfer->Idx += (strlen(temp)+1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #else
BOOLEAN unpackBoolean(XferBuffer *xfer) {
                                                                                                                                            char* unpackString(XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int unpackInteger(MferBuffer *xfer) {
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #ifdef _NO_PROTO
BOOLEAN unpackBoolean(xfer)
                                     #ifdef _NO_PROTO
char* unpackString(xfer)
XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int unpackInteger(xfer)
XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         delta = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BOOLEAN temp;
int delta;
                                                                                                                                                                                                                                                                                                                                                                  return temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return temp;
                                                                                                                                                                                                              char *temp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temb,
                                                                                                                                                                 #endif
                                                                                                                        #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int
```

```
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #endif
                                                                                                                                                                                                                                                                                                                                                                         #else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SPptr->next = (SPLINE_PTR) malloc(sizeof(SPLINE_NODE));
SPptr = SPptr->next;
                                                                                                                                                                                                                                                                                                                                                                       if (strcmp(header, (char*) End_of_Spline) == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /* Recover the Spline marker */
                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (Sphead == NULL) {
Spptr = (SPLINE_PTR) malloc(sizeof(SPLINE_NUDE));
Sphead = SPptr;
                                  SPLINE_PTR unpackSpline(MferBuffer *xfer) { #sndif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BOOLEAN readChkWord(int *chkWord, int Chl) {
                                                                                                                                                                                                     char *End_of_Spline = "}End_of_Spline";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SPptr->x = unpackInteger(xfer);
SPptr->y = unpackInteger(xfer);
SPptr->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #ifdef_NO_PROTO
BOOLEAN readChkWord(chkWord, Chl)
int *chkWord;
                                                                                                                                                                                                                                                                                                                                 header = unpackString(rfer);
                                                                                                                  BDULEAN contloop;
SPLINE_PTR SPptr, SPhead;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int xfer_size, int_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                            contloop = false;
                                                                                                                                                                                                                                                                                                              while (contLoop) {
                                                                                                                                                            *header;
                                                                                                                                                                                                                                                 contloop = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free (header);
KferBuffer *xfer;
                                                                                                                                                                                                                                                                    SPhead = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return SPhead;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else {
                                                                                                                                                                                                                                                                                                                                                                                                                                        else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #6189
```

```
if ((write(Chl, &int_size, int_size) == int_size) &&
  (write(Chl, &chkWord, int_size) == int_size))
                                                                                                                                                                                                                                                                                                                  BOOLEAN writeChkWord(int chkWord, int Chl) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf("Error in writeChkWord\n");
                                                    alse {
    #ifdef GE_DEBUG
    printf("Error in readChkWord\n");
    #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return writeChkWord(CHKWORD, Chl);
}
                                                                                                                                                                                                             #ifdef _NO_PROTO
BOOLEAN writeChkWord(chkWord, Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN synch_write(int Chl) {
                                                                                                                                                                                                                                                                                                                                                                                                         int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef _NO_PROTO
BOOLEAN synch_write(Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
BOOLEAN synch_read(Chl)
int Chl;
                                                                                                          return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return false;
                                      return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            else {
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                        int int_size;
                                                                                                                                                                                                                                                  int chkWord;
                                                                                                                                                                                                                                                                int Chl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int Chl;
                                                                                                                                                                                                                                                                                                                                     #endif
```

```
#else
BOOLEAN packOperatorList(OP_LIST operator_list, MferBuffer *xfer) {
= unpackString(xfer);
= unpackInteger(xfer);
                                                                                           = unpackInteger(xfer);
                                                                                                                      = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      packed &= packInteger(OP->label_x_offset, xfer);
packed &= packInteger(OP->label_y_offset, xfer);
                                                                                                                                                    graph->cur_op_spec_met_unit = unpackInteger(xfer);
                                                                                                                                                                                   graph->cur_op_is_terminator = unpackInteger(xfer);
                                                         = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            packed &= packInteger(OP->met_x_offset, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     packed &= packInteger(OP->met_y_offset, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   packed &= packInteger(OP->timing_type, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            packed &= packString(OP->label, xfer);
packed &= packInteger(OP->label_font, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           packed &= packID_LIST(OP->met_requts, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char *End_of_Operators = "}End_of_Operators";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                packed &= packInteger(OP->met_unit, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              packed &= packInteger(OP->met_font, xfer);
                                                                                                                                                                                                                                                                                                                                                                                            BOOLEAN packOperatorList(operator_list, rfer)
OP_LIST operator_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   packed &= packInteger(OP->x, xfer);
packed &= packInteger(OP->y, xfer);
packed &= packInteger(OP->radius, xfer);
packed &= packInteger(OP->radius, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  packed &= packInteger(OP->op_num, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  packed &= packInteger(OP->period, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        packed &= packString(Operator, xfer);
packed &= packInteger(OP->id, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 packed &= packInteger(OP->met, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = "}Operator";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   while ((OPlist != NULL) && packed) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OPlist = operator_list;
                                                         graph->current_op_name
                                                                                                                      graph->cur_op_spec_met
                                                                                        graph->current_op_num
  graph->parent_op_name
graph->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OP = OPlist->op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN packed;
OP_LIST OPlist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                           XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char *Operator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OPERATOR OP;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN packGraphNames(GRAPH_DESC graph, XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          packed &= packInteger(graph->cur_op_spec_met_unit, zfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        packed &= packInteger(graph->cur_op_is_terminator, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void unpackGraphNames(GRAPH_DESC graph, MferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    packed &= packInteger(graph->cur_op_spec_met, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          packed &= packString(graph->current_op_name, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     packed &= packInteger(graph->current_op_num, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                packed &= packString(graph->root_op_name, rfer);
packed &= packInteger(graph->root_op_num, rfer);
packed &= packString(graph->parent_op_name, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackString(xfer);
= unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           packed &= packInteger(graph->parent_op_num, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               printf("error in packGraphNames\n");
                                                                                                                                                                                                              return readChkWord(&chkWord, Chl);
                                                                                                                                                                                                                                                                                                                                                                      BOOLEAN packGraphNames(graph, xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void unpackGraphNames(graph, xfer)
                                                       BOOLEAN synch_read(int Ch1) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         graph->root_op_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       graph->root_op_num
                                                                                                                                                                                                                                                                                                                                                                                                    GRAPH_DESC graph;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GRAPH_DESC graph;
MerBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BOOLEAN packed;
                                                                                                                                                                                                                                                                                                                                                                                                                             MerBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            packed = true;
                                                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return packed;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef GE_DEBUG
                                                                                                                                                       int chkWord;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (!packed)
                                                                                           #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     telse
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #e1se
                                   #0150
```

```
header = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP->label_x_offset
OP->label_y_offset
                                                                                                                                                                                                                                                                                                         contloop = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OP->period_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OP->met_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP->met_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OPptr->op = OP;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OP->timing_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OP->period_unit
                                                                                                                                                                                                       while (contloop) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OPptr = OPptr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OP->met_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OP->label_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OP->mrt_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP->fw_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OP->met_unit
                                                                                                                            contloop = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OP->met_font
    *header;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OP->mrt_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OP->fw_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OP->op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OP->period
                                                                                                                                                   OPhead = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OP->radius
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OP->color
                     OPERATOR OP;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OP->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP->met
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DF--40
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 0P->x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           0P->y
                                                                                                                                                                                                                                                                                                                                                           else {
                                                                                                                                                                                                                                                                                                                                                                                                                               packed &= packString(OP->timer_op_list, xfer);
packed &= packID_LIST(OP->key_word_list, xfer);
packed &= packString(OP->operator_informal_desc, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packString(OP->operator_formal_desc, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 packed &= packString(OP->operator_impl_lang, xfer);
                                                                                                                                                                                                                                                                                                                                                                                  packed &= packString(OP->output_guard_list, xfer);
packed &= packString(OP->exception_list, xfer);
                                                                                                                                                                                                                                                                                                                                                    packed &= packID_LIST(UP->trigger_requts, xfer);
packed &= packInteger(OP->period_unit, xfer);
packed &= packID_LIST(OP->period_requts, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packBoolean(OP->is_terminator, xfer);
                                                                                                                                                                                                                          packed &= packInteger(OP->mcp.unit, xfer);
packed &= packID_LIST(OP->mcp.requts, xfer);
packed &= packInteger(OP->trigger_type, xfer);
packed &= packID_LIST(OP->trigger_set, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                packed &= packBoolean(OP->is_composite, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      packed &= packBoolean(DP->is_modified, xfer);
packed &= packBoolean(DP->is_deleted, xfer);
                                                                                                                                                                        packed &= packID_LIST(UP->mrt_reqmts, xfer);
                                              packed &= packInteger(OP->fu, xfer);
packed &= packInteger(OP->fu, unit, xfer);
packed &= packID_LIST(OP->fu_requex, xfer);
packed &= packInteger(OP->mrt, xfer);
packed &= packInteger(OP->mrt_unit, xfer);
                                                                                                                                                                                                                                                                                                                            packed &= packString(UP->if_condition, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          packed &= packString(End_of_Operators, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OP_LIST unpackOperatorList(AferBuffer *xfer) { #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 packed &= packBoolean(OP->is_new, rfer);
                                                                                                                                                                                                       packed &= packInteger(OP->mcp, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               printf("error in packOperatorList\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OP_LIST unpackOperatorList(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OPlist = OPlist->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN contLoop;
OP_LIST OPptr, OPhead;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (ferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef _ND_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return packed;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (!packed)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #else
```

```
if (strcmp(header, (char*) End_of_Operators) == 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackInteger(zfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = unpackID_LIST(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = unpackID_LIST(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = unpackID_LIST(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            unpackID_LIST(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                        OPptr->next = (OP_LIST) malloc(sizeof(OP_LIST_NODE));
                                                                                                                                                                                                                                                                                                            if (OPhead == NULL) {
    Opptr = (OP_LIST) malloc(sizeof(OP_LIST_NODE));
    OPhead = OPptr;
char *End_of_Operators = "}End_of_Operators";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OP = (OPERATOR) malloc(sizeof(OP_NODE));
```

```
BOOLEAN packStreamList(ST_LIST stream_list, XferBuffer *xfer) {
                                   = unpackInteger(xfer);
= unpackID_LIST(xfer);
                                                                           = unpackString(xfer);
= unpackID_LIST(xfer);
                                                                                                                                                                                     = unpackID_LIST(xfer);
                 = unpackID_LIST(xfer);
                                                                                                                                                                                                                                                                                                  = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                         = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                          = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                     = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                 = unpackBoolean(xfer);
                                                                                                                = unpackString(xfer);
                                                                                                                                                                                                           OP->operator_informal_desc = unpackString(xfer);
                                                                                                                                            = unpackString(xfer);
                                                                                                                                                                 = unpackString(xfer);
                                                                                                                                                                                                                               = unpackString(xfer);
                                                                                                                                                                                                                                                      = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                      /* Recover the header marker */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char *End_of_Streams = "}End_of_Streams";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN packStreamList(stream_list, xfer) ST_LIST stream_list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        packed &= packString(Stream, xfer);
packed &= packInteger(ST->id, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while ((STlist != NULL) && packed) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = "}Stream";
                                                                                                                                                                                                                                   OP->operator_formal_desc
                                                                                                                                                                                                                                                      OP->operator_impl_lang
                                                                                                                      OP->output_guard_list
OP->exception_list
                                                                                                                                                                                                                                                                                                                                                                                                          OPptr->next = NULL;
                                                                                                      OP->trigger_requts
                                                                                                                                                                 OP->timer_op_list
                                                                                                                                                                                       OP->key_word_list
                                                                                                                                                                                                                                                                                                  OP->is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STlist = stream_list;
                                       OP->trigger_type
                                                                              OP->if_condition
                                                                                                                                                                                                                                                                            OP->is_composite
                                                                                                                                                                                                                                                                                                                                           OP->is_modified
                                                           OP->trigger_set
                                                                                                                                                                                                                                                                                                                                                                   OP->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ST = STlist->st;
                     DP->mcp_requts
OP->mcp_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                      free (header);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN packed;
ST_LIST STlist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                     OP->is_new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return OPhead;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char *Stream
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STREAM ST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #endif
```

```
packed &= packString(ST->state_initial_value, xfer);
packed &= packString(ST->label, xfer);
packed &= packIntegar(ST->label_font, xfer);
packed &= packIntegar(ST->label_Loffset, xfer);
packed &= packIntegar(ST->label_Loffset, xfer);
packed &= packIntegar(ST->label_yoffset, xfer);
packed &= packIntegar(ST->to, xfer);
packed &= packIntegar(ST->to, xfer);
packed &= packIntegar(ST->to, xfer);
packed &= packIntegar(ST->latency, xfer);
packed &= packIntegar(ST->latency, xfer);
packed &= packIntegar(ST->latency, xfer);
packed &= packIntegar(ST->latency_unit, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            packed &= packBoolean(ST->is_state_variable, rfer);
                                                                                                                                                                                                                                                                                                                                                                                    packed &= packInteger(ST->latency_y_offset, xfer);
                                                                                                                                                                                                                                                                                                                                                     packed &= packInteger(ST->latency_x_offset, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packString(ST->stream_type_name, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     packed &= packBoolean(ST->is_modified, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  packed &= packBoolean(ST->is_deleted, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               packed &= packBoolean(ST->is_new, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         packed &= packString(End_of_Streams, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ST_LIST unpackStreamList(XferBuffer *xfer) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *End_of_Streams = "}End_of_Streams";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 printf("error in packStreamList\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef _NO_PROTO
ST_LIST unpackStreamList(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STlist = STlist->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BUCLEAN contloop;
ST_LIST STptr, SThead;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     while (contLoop) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *header;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                contloop = true;
SThead = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                MerBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return packed;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (!packed)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STREAM ST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #e1se
```

```
int Chl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #else
                                   if (strcmp(header, (char*) End_of_Streams) == 0) {
                                                                                                                                                                                                                    STptr->next = (ST_LIST) malloc(sizeof(ST_LIST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* Recover the header marker */
                                                                                                                                                                                                                                                                                                                                              = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                               unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                          = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                          mpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                                   = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                       = unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  unpackInteger(xfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackString(rfer);
                                                                                                                                                                                                                                                                                                                                                                = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = unpackString(rfer)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   unpackSpline(xfer)
                                                                                                                             STptr = (ST_LIST) malloc(sizeof(ST_LIST_NUDE));
SThead = STptr;
                                                                                                                                                                                                                                                                               ST = (STREAM) malloc(sizeof(ST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BUOLEAN readAction(next_action, xfer, Chl)
header = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ST->state_initial_value
                                                                                              else {
  if (SThead == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ST->is_state_variable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ST->latency_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ST->latency_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ST->stream_type_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              STptr->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                       ST->label_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                          ST->label_y_offset
                                                       contloop = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ST->latency_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ST->latency_font
                                                                                                                                                                                                                                                                                                       STptr->st = ST;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ST->is_modified
                                                                                                                                                                                                                                            STptr = STptr->next;
                                                                                                                                                                                                                                                                                                                                                                                 ST->label_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ST->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ACTION next_action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free (header);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ST->latency
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           MferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ST->is_new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return SThead;
                                                                                                                                                                                                                                                                                                                                                                ST->label
                                                                                                                                                                                                                                                                                                                                                                                                                                            ST->from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ST->arc
                                                                                                                                                                                                 else {
                                                                                                                                                                                                                                                                                                                                            ST->id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                ST->to
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int Chl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #0150
```

```
= (GE_ACTION_TYPE) unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN writeAction(ACTION next_action, XferBuffer *xfer, int Chl) {
BOOLEAN readAction(ACTION next_action, XferBuffer *xfer, int Chl) {
                                                                                                                                                       free((char*) next_action->next_op); next_action->next_op = NULL;
                                                                                                                                                                                                                                                                                                                                                                      = unpackBoolean(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                      next_action->next_op_num = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                      = unpackString(xfer);
                                                                                                                            /* recover any allocated space to next_action */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BOOLEAN writeAction(next_action, rfer, Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("error in readAction\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            printf("error in readAction\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                  chkWord = unpackInteger(xfer);
                                                                                                                                                                                                                               if (read_xfer(Chl, xfer)) {
                                                                                                                                                                                                                                                                                                                 /* unpack next_action */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (chkWord = CHKWORD)
                                                                                                                                                                                                                                                                                                                                                                      next_action->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                  next_action->next_op
                                                                                                                                                                                                                                                                                                                                                next_action->option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACTION next_action;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return true;
                                                                                                                                                                                                            /* fetch data */
                                                                                                                                                                                                                                                                                      xfer->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BOOLEAN packed;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int int_size;
                                                                          int chkWord;
```

```
printf("****ERROR IN readGraphDesc unpacking graph desc****\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 BUGLEAN writeGraphDesc(GRAPH_DESC graph, MferBuffer *xfer, int Chl) { #endif
                                                                                                                                                                                                                                                                                                                                                                   printf("****ERROR IN readGraphDesc reading xfer buffer***\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      packed &= packString(graph->graph_informal_desc, xfer);
packed &= packID_LIST(graph->avail_impl_langs, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    packed &= packOperatorList(graph->operator_list, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              packed &= packStreamList(graph->stream_list, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         packed &= packStreamList(graph->output_list, xfer);
     = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             packed &= packStreamList(graph->input_list, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           packed &= packString(graph->global_types, xfer);
packed &= packInteger(CHKWORD, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packID_LIST(graph->timer_list, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      packed &= packString(graph->cur_op_spec, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN writeGraphDesc(graph, xfer, Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packGraphNames(graph, xfer);
                                                          if (unpackInteger(xfer) == CHKWORD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /* send data */
if (packed && write_xfer(Chl, xfer))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* build the buffer */
       graph->global_types
                                                                                                                                                                                                                            return false;
                                                                                      return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                BOOLEAN packed;
                                                                                                                                                                                                                                                                                                                                                                                                                        return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GRAPH_DESC graph;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       xfer->Idx = 0;
                                                                                                                                         #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                           else {
#ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int int_size;
                                                                                                                  else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int Chl;
                                                                                                                                                                                                                                                                                                                                                                                            #endif
                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #e1se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                BUDLEAN readGraphDesc(GRAPH_DESC graph, XferBuffer *xfer, int Chl) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = unpackOperatorList(xfer);
                                                                                                                                                                    packed &= packInteger((int) next_action->option, xfer);
                                                                                                                                                                                                                                                   packed &= packInteger(next_action->next_op_num, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackStreamList(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = unpackStreamList(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = unpackStreamList(xfer);
                                                                                                                                                                                                packed &= packBoolean(next_action->reinvoke, rfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           graph->timer_list = unpackID_LIST(xfer);
graph->graph_informal_desc = unpackString(xfer);
graph->avail_impl_langs = unpackID_LIST(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = unpackString(xfer);
                                                                                                                                                                                                                     packed &= packString(next_action->next_op, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* recover any allocated space to graph */
                                                                                                                                                                                                                                                                               packed &= packInteger(CHKWORD, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN readGraphDesc(graph, xfer, Chl)
                                                                                                                                                                                                                                                                                                                                    /* send data */
if (packed && write_xfer(Chl, xfer))
                                                                                                                                                                                                                                                                                                                                                                                                                                                      printf("error in writeAction\n");
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   unpackGraphNames(graph, xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* fetch data */
if (read_xfer(Chl, xfer)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /* unpack next_action */
int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             graph->operator_list
                                                                                                             /* build the buffer */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       graph_release(graph);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         graph->stream_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  graph->output_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            graph->cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      graph->input_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              rfer->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              GRAPH_DESC graph;
                                                                                                                                                                                                                                                                                                                                                                                                 return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          MferBuffer *xfer;
                                                          rfer->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                               #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int chkWord;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int Chl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #else
```

```
BOOLEAN writeErrorMsgs(ERROR_MSGS errs, XferBuffer *xfer, int Chl) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       while ((ErrPtr != NULL) && packed) {
  packed &= packInteger(ErrPtr->parent_op_num, xfer);
  packed &= packString(ErrPtr->parent_op_label, xfer);
  packed &= packInteger(ErrPtr->cur_op_num, xfer);
  packed &= packString(ErrPtr->cur_op_num, xfer);
  packed &= packString(ErrPtr->cur_op_label, xfer);
  packed &= packString(ErrPtr->cmsg, xfer);
                                         printf("error in readErrorMsgs\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("error in writeErrorMsgs\n");
                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN writeErrorMsgs(errs, rfer, Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       packed &= packInteger(CHKWORD, xfer);
                                                                                                                                                                                                                  printf("error in readErrorMsgs\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (packed && write_xfer(Chl, xfer))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ErrPtr = ErrPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ERROR_MSGS ErrPtr;
                                                                                           return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return false;
                                                                                                                                                                                                                                                                  return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       MerBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BOOLEAN packed;
                                                                                                                                                                                                                                                                                                                                                                                                                                             ERROR_MSGS errs;
                                                                                                                                                                                                                                                                                                                                                                                             #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  packed = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ErrPtr = errs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              xfer->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return true;
                #ifdef GE_DEBUG
                                                                                                                                                                                           #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #ifdef GE_DEBUG
                                                                                                                                                                  else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int Chl;
                                                                  #endif
                                                                                                                                                                                                                                           #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN readErrorMsgs(ERROR_MSGS *errs, XferBuffer *xfer, int Chl) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* Stop before the CHKWORD */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
ErrPtr->next = (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = unpackInteger(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ErrPtr->parent_op_num = unpackInteger(xfer);
ErrPtr->parent_op_label = unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = unpackString(xfer);
= unpackString(xfer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       while ((xfer->Idx) < xfer_size) {
   if (*errs == NULL) {
    ErrPtr = (ERROR_NGGS) malloc(sizeof(ERROR_NGDE));</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (xfer_size = read_xfer(Chl, xfer)) {
                                                                    printf("error in writeGraphDesc\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (unpackInteger(xfer) == CHKWORD)
                                                                                                                                                                                                                                           #ifdef _NO_PROTO
BODLEAN readErrorMsgs(errs, xfer, Chl)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* Recover allocated memory */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              xfer_size -= int_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    err_msgs_release(errs);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ErrPtr->cur_op_num
ErrPtr->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int int_size, xfer_size;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int_size = sizeof(int);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ErrPtr = ErrPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ERROR_MSGS ErrPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       xfer->Idx = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ErrPtr->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return true;
                                                                                                                                                                                                                                                                                             ERROR_MSGS *errs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ErrPtr->msg
                                                                                                                      return false;
                                                                                                                                                                                                                                                                                                                       MferBuffer *xfer;
return true;
                                           #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       *errs = ErrPtr;
                                                                                                                                                                                                                                                                                                                                                int Chl;
                                                                                                #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                  #endif
                                                                                                                                                                                                                                                                                                                                                                                                  telse
```

#endif

```
}
#ifdef __cplusplus
}
```

_met_selected, _op_handles_drawn,	_name_handles_drawn, met handles drawn;	_met_handles_drawn;		//	OP ID id: /* vertex number */	'ob_num;		int _x,	-Y,	_radius,	_color;	**	char *_name_ptr; /* *label; */ int _name_font.	_name_x,	_name_y;	inttiming_type;		100met_::::::::::::::::::::::::::::::::::	_met_font,	_met_x,		ID_LIST _met_requts;	int period.	ID_LIST _period_requts;		int _fw,	TO LIST for recents:		int _mrt,		ID_LIST _mrt_reqmts;		intmcp,	ID LIST men reques:		Ħ		ID_LIST _trigger_requts;	char* output guard list:	
****			Program: graph_editor	Date Modified: If Dep 92 Remarks: This is the specification for the DestatorObject	υ,		The OperatorObject class is the graphical	representation of a PSDL operator. It has three	physical forms: circular for an atomic operator,	two concentric circles for a non-atomic operator,	and rectangular, for terminators. A terminator	simulates interaction with objects outside the system.	Recuring:	Modified by Doug Lange to add new operator properties 9/8/96	A A C C C C C C C C C C C C C C C C C C		61 96/10/04 Ken Moeller	Nemoved un-needed routines to read and write to disk.	62 96/10/05 Ken Moeller		a signed value of met.		EG GO/10/00 hem mostler Removed un-massied routines to read and unite to broberty.	64 96/10/07 Ken Moeller	Changes to ge_interface.b		排泄排泄损损损损损损损损损损损损损损损损损损损损损损损损损损损损损损损损损损	#ILIMAT OPERATOR OF A TANAMAN TO A TANAMAN T		#include <stdio.h></stdio.h>	#include <x11 xlib.h=""></x11>	#include "ge_defs.h"		#include "ge_interiace.n" //Added by DL 9/8/90 #include "ge utilities.h" //Added by DL 9/13/96	class OperatorObject : public GraphObject {	ted:	h.	_name_width,	int _met_width, _met_herght;	"nate of contract the contract that the contract the contract the contract that the contract the

```
void move_handle(int x, int y);
BOOLEAN text_selected() {return (_name_selected || _met_selected);}
                                                                                                                                                                                                                                         void delete_notify(CLASS_DEF class_type, OP_ID deleted_obj_id);
void undelete_notify(CLASS_DEF class_type, OP_ID deleted_obj_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -- Methods to get values of ge_interface.h --
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     {return dup_str(_name_ptr);}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        //Member functions added by DL 9/8/96; KBM 10/24/96
                      BOOLEAN over(int x, int y); // Added 8/26/96, dha
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             [return _name_font;]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            [return _timing_type;]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int handle_selected() {return _handle_selected;} void set_handle_selected(int handle);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        {return _y;}
{return _radius;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  {return _op_num;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                {return _met_unit;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (return _met_font;)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   [return _name_x;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             [return _name_y;]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           {return _color;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (return _met_x;)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              {return _id;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        {return _met;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  {return _x;}
                                                                                                                                                                                             void move_notify(CLASS_DEF , OP_ID ) {}
                                                                                                                                                                                                                                                                                                                    BOOLEAN hit_handle(int x, int y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void set_default_name_location();
                                                                                                                                            void set_location(int x, int y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void set_default_met_location();
                                                                                                XYPAIR intercept(int x, int y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void text_locate(int x, int y);
BOOLEAN hit(int x, int y);
                                                                                                                                                                       void move (int x, int y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             name_font()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         timing_type()
                                                                                                                                                                                                                                                                                                                                                                                                                                        int text_height();
                                                                                                                                                                                                                                                                                                                                                                                                                    int text_width();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           met_unit()
met_font()
                                                                        XYPAIR center();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ob_num()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              radius()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           name_y()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           color()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *name()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              met_x()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ) pt
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        met()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          0P_10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int
int
int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ij
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // Deep copy constructor from an OPERAIOR (ge_interface) OperatorObject(char *in_name_ptr, OP_ID in_id, OP_ID in_op,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // Allocates storage and copies to OPERATOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Recovers all dynamic memory
                                                                                                                                                                                                                                                                                                                                                                                                                  void draw_handles(GC draw_context, int x1, int y1, int x2, int y2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  OperatorObject(); // Constructor which initializes all data elemets
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int in_x, int in_y, int in_radius, int in_color, BUGLEAN in_is_new, BUGLEAN in_is_new;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OperatorObject& operator=(OperatorObject& src);
OPERATOR clone();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BUOLEAN in_is_terminator);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CLASS_DEF is_a() {return OPERATOROBJECT;}
                                                                                                                                                                                                                                                                                                                                                                  void set_object_font(int font_id);
                                                                                                                                                                                                                                                                                                                                                                                                                                          void reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void draw_text(DRAW_STYLE style);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void set_default_text_location();
                                              _operator_informal_desc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void copy(OperatorObject *src);
void read_from(OPERATOR op);
                                                                      _operator_formal_desc;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           roid move_text(int x, int y);
                                                                                                _operator_impl_lang;
                                                                                                                                                                                                                                                                                                                                                                                          void set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void draw(DRAW_STYLE style);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           OperatorObject(OPERATOR op);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void write_to(OPERATOR on);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             virtual "OperatorObject();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int in_met, int in_unit,
                          ID_LIST _key_word_list;
                                                                                                                                                                       _is_terminator;
                                                                                                                                          BOOLEAN _is_composite,
                                                                                                                                                                                                                       _is_modified,
                                                                                                                                                                                                                                               is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void initialize();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void erase_text();
                                                                                                                                                                                             BOOLEAN is new.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void select();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void erase();
                                                                          char*
                                                                                                char*
```

BOOLEAN is_new() {return_is_new;} BOOLEAN is_modified() {return_is_modified;} BOOLEAN is_deleted() {return_is_deleted;}	//	<pre>void x(int x)</pre>	<pre>void name(char *new_name); void name_font(int name_font) {_name_font = name_font;} void name_x(int name_x) {_name_x = name_x;} void name_y(int name_y) {_name_y = name_y;}</pre>	<pre>void timing_type(int timing_type) {_timing_type = timing_type;}} void mat(int met) void mat(int met_unit) {_met = met;} void met_unit(int met_unit) {_met_font = met_init;} void met_font(int met_int) {_met_font = met_font;} void met_x(int met_x) {_met_x = met_x;} void met_y(int met_x) {_met_y = met_y;} void met_y(int met_x) {_int_x = met_y;} void met_requata_dhy(ID_LIST x) {_id_list_replace(k_met_requts, x);} void set_met(int met. int int);</pre>	<pre>void period(int period) {_period = period;} void period_unit(int period_unit) {_period_unit = period_unit;} void period_requts_dup(ID_LIST x) {id_list_replace(k_period_requts, x);} void fw(int fw) {_fw = fw;} void fw_unit(int fw_unit) {_fw_unit = fw_unit;} void fw_requts_dup(ID_LIST x) {id_list_replace(k_fw_requts, x);}</pre>	<pre>void mrt(int mrt)</pre>	<pre>void trigger_type(int trigger_type) {_trigger_type = trigger_type;} void trigger_set_dup(ID_LIST x) {id_list_replace(k_trigger_set, x);}//64 void trigger_requts_dup(ID_LIST x) {id_list_replace(k_trigger_requts, x);} void trigger_if_condition(char *x) {free(_trigger_if_condition); _trigger_if_condition = dup_str(x);}</pre>
<pre>int met_y() ID_LIST* met_req_by_adr()</pre>	<pre>int period() {return _period;} int period_unit() {return _period_unit;} ID_LIST* period_requby_adr() {return &_period_requts;} ID_LIST period_requts_copy() {return id_list_copy(_period_requts);} BUDLEAN period_requts_avail() {return (_period_requts != NULL);}</pre>	<pre>int fw() {return_fw;} int fw_unit() {return_fw_unit;} ID_LIST*fw_req_by_adr() {return k_fw_requts;} ID_LIST fw_requts_copy() {return id_list_copy(_fw_requts);} BOOLEAN fw_requts_avail() {return (_fw_requts != NULL);}</pre>	<pre>int mrt()</pre>	freturn _m freturn _mc freturn freturn freturn it freturn _tr freturn _tr	A C C C C C C C C C C C C C C C C C C C	char* times_op_list() (return &_key_word_list;) ID_LIST* key_word_list_adr() (return &_key_word_list;) ID_LIST key_word_list_copy() (return id_list_copy(_key_word_list);) char* operator_informal_desc() (return dup_str(_operator_informal_desc);) char* operator_formal_desc() (return &_operator_informal_desc); char* operator_formal_desc() (return dup_str(_operator_formal_desc);) char* operator_formal_desc_adr() (return &_operator_formal_desc);)	<pre>char* operator_impl_lang() {return dup_str(_operator_impl_lang);} char** operator_impl_lang_adr() {return &_operator_impl_lang;} BOOLEAN is_composite() {return _is_composite;} BOOLEAN is_terminator() {return _is_terminator;}</pre>

```
{ is_new = is_new;}
{ is_modified = is_modified;}
{ is_modified = true;}
{ is_deleted = is_deleted;}
{ is_deleted = true;}
void is_composite(BUOLEAN is_composite) {_is_composite = is_composite;}
void is_terminator(BUOLEAN is_terminator);
                                                         void is_nev(BDDLEAN is_nev)
void is_modified(BDDLEAN is_modified)
void set_modified()
void is_daleted(BDLEAN is_deleted)
void set_deleted()
                                                                                                                                                                                                                                 #endif;
                                                                                                                                                                                      ;;
                                                                                                                                                               _operator_formal_desc = dup_str(x);}
                                                                                                                                                                                                                                                                                                              _operator_impl_lang = dup_str(x);}
                                        _output_guard_list = dup_str(x);}
                                                                              _exception_list = dup_str(x);}
                                                                                                                           _timer_op_list = dup_str(x);}
                                                                                                                                                                                                                                                    {free(_operator_formal_desc);
                                                                                                                                                                                                                                                                                           void operator_impl_lang(char *x)
{free(_operator_impl_lang);
                 {free(_exception_list);
void timer_op_list(char *x)
                                                                                                                         {free(_timer_op_list);
```

** */	计算 化氯化苯酚苯甲酚医甲酚甲酚医甲酚甲酚医甲酚甲酚甲酚甲酚甲酚甲酚甲酚甲酚甲酚甲酚甲酚甲酚	Switched to dup_str which produces an empty string ("")
		for a NULL pointer.
Name:	operator_obje	
Author:		/ * **********************************
Program:	m: graph_editor	#include <string.h></string.h>
Date	:fied:	#include <stdlib.h></stdlib.h>
Remarks:	s: This is the implementation of the Operator Object	#include <math.h></math.h>
	Ü	#include <stream.h></stream.h>
		#include "operator object.h"
	The OperatorObject class is the graphical	
	representation of a DADI operator. It has three	
	- 5	#define COMPOSITE SPACE 5
	projector totals. Circular for an accura operators	
	CONCENSION TO TELEFORM TO A HOME ACCOUNTS ON	OF HISPART CHARACTERS TO A LANG.
	and rectangular, for terminators. A terminator	
	simulates interaction with objects outside the system.	
		UPPERRIGHT
		_
Credits:	s: Portions of code are adapted from the following:	#define LOWERLEFT 4
		#define MINRADIUS 5
	Barakati, Naba, X Window System Programming, SAMS, 1991.	
		OperatorObject::OperatorObject() : GraphObject() {
	Heller, Dan, Motif Programming Manual, O'Reilly and	
	Associates, 1991.	initialize();
	Johnson, Eric, and Reichard, Kevin, X Window Applications Programming, MIS Press, 1989.	•
	Young, Douglas, Object Griented Programming With C++	// Added by Doug Lange 9/10/96. Builds operator from SDE structure
	and users, requests, 1992.	OperatorObject::OperatorObject(OPERATOR op) : GraphObject() {
Reeng	Reengineering:	
Modif	Modified by Doug Lange to add member functions for new operator properties. 9/8/96	initialize(); this->read_from(op);
History:	*A	}
6	96/10/04 Ken Moeller	OberatorObject::OberatorObject(char *in name ptr.
;	Removed code to read and write to disk.	OP_ID in_id, OP_ID in_op,
		int in_met, int in_met_unit,
62	96/10/05 Ken Moeller	int in_x, int in_y,
	Corrections to building oprator from ge_interface.	int in_radius, int in_color,
;		BOOLEAN in is new,
9	96/10/06 Ken Moeller	
	Removed code to read and write to property.	BOOLEAN in_is_terminator) {
40	96/10/06 Ken Moeller	initialize();
	Fixes to time units.	e_ptr
		= in_id;
9 2	96/10/07 Ken Moeller	_num_
	Changes to ge_interface.h	
9	##[[### ##X 80/01/80	-y = 1n_y; -y = in radius:
9	TO YOU WAT HOATTAT	

```
int i, end_prev_index = -1, widest_string = 0, num_breaks = 0,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         draw_context, x2 - HANDLESIZE, y2 - HANDLESIZE,
                                                                                                                                                                                                XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y1, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                              XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x2 - HANDLESIZE, y1, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                 XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y2 - HANDLESIZE, HANDLESIZE,
                              XFillRectangle(_display_ptr, _draw_window, draw_context, x1,
y2 - HANDLESIZE, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _name_font
x2 - HANDLESIZE, y1, HANDLESIZE, HANDLESIZE);
                                                                                            XFillRectangle(_display_ptr, _draw_window, draw_context, x2 - HANDLESIZE, y2 - HANDLESIZE, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // underscores in the first and last character of the string.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // and _met_font must be set before calling. Text strings
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     widest_start_index, temp_width, temp_height, str_len;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // are automatically broken at underscores, except for
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XFillRectangle(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       widest_start_index = end_prev_index + 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XSetFunction(_display_ptr, draw_context, GXcopy);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Determines the dimensions of the text blocks.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_width = str_len - 1 - end_prev_index;
if(temp_width > widest_string) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        widest_string = temp_width;
widest_start_index = end_prev_index + 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if((i i = 0) kk (i i = (str_len - 1))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void OperatorObject::set_text_dimensions() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(temp_width > widest_string) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_width = i - end_prev_index;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(end_prev_index < (str_len - 1)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     widest_string = temp_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       char temp_str[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             str_len = strlen(_name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         for(i = 0; i < str_len; i++)
                                                                                                                                                          HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                  HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                     HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(_name_ptr[i] == '_')
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     end_prev_index = i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_name_ptr == NULL) {
    _name_width = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  num_breaks++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _name_height = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else {
                                                                 // over-rides _met values
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OperatorObject& OperatorObject::operator=(OperatorObject& src) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    printf("OperatorObject Destructor for: %s\n", _name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Draws handles around the given coordinates. Drawn in
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       woid OperatorObject::draw_handles(GC draw_context, int x1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XFillRectangle (_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int y1, int x2, int y2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        OPERATOR on = (OPERATOR) malloc(sizeof(OP_NODE));
                                                                                                   = in_is_composite;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              release(); // Recover all dynamic memory
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      exclusive-or mode to simplify erasure.
                                                                                                                                  = in_is_new;
                                                                                                                                                                                                                                                                                                                                                                                                                                     OperatorObject:: "OperatorObject() {
                                                                 is_terminator(in_is_terminator);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OPERATOR OperatorObject::clone() {
                              set_met(in_met, in_met_unit);
                                                                                                                                                                                                                               set_text_dimensions();
set_default_text_location();
set_default_met_location();
                                                                                                                                                                                                                                                                                                                                     reset_handles_drawn_state();
   = in_color;
                                                                                                      _is_composite
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return *this;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               write_to(on);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      copy (ksrc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return on;
                                                                                                                                        lis_new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #endif
```

```
// kbm for g++
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // kbm for g++
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XDrawString(_display_ptr, _draw_window, draw_context, x,
                                                                                                                                   void OperatorObject::write_block(GC draw_context, int x, int y,
                                                                                                                                                                                                          int i, str_len, num_lines = 1, string_width, start_index = 0,
                                                                                                                                                                                                                                                                              char *block_text[MAXIEXILINES], temp_string[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                block_text[num_lines - 1] = dup_str(temp_string);
// Writes a text block to the drawing canvas. Text string
// are broken at underscores, except when in the first and
// last character position or if line contains a '.' or '('
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for(i = 0; i < str_len; i++)
if ((instring[i] == '_.') & !ignore_underscore) {
   if((i != 0) & (i != (str_len - 1))) {</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         strncpy(temp_string, &(instring[start_index]),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_string[string_width] = '\0';
block_text[num_lines - 1] = dup_str(temp_string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ignore_underscore = (strchr(instring,'.') != 0) ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XDrawString(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              strncpy(temp_string, &(instring[start_index]),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      - (yinc * (num_lines - i - 1)),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       y - (yinc + (num_lines - i - 1)),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (strchr(instring,'(') != 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_string[string_width] = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      string_width = i - start_index +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              block_text[i], str_len);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   block_text[i], str_len);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           string_width = i - start_index + 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                str_len = strlen(block_text[i]);
                                                                                                                                                                          char *instring, int block_height) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for(i = 0; i < num_lines; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            yinc = block_height / num_lines;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             draw_context, x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   string_width);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(start_index < str_len) {</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       start_index = i + 1;
                                                                                                                                                                                                                                                                                                                                                                                                                        str_len = strlen(instring);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     string_width);
                                                                                                                                                                                                                                                                                                                 BUOLEAN ignore_underscore;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              free(block_text[i]);
                                                                                                                                                                                                                                          yinc, block_index = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    num_lines++;
                                                                                                                                                                                                                                                                                                                                                                                        if(instring != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(str_len != 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         num_lines--;
                                                                                                                                                                                                                 // kbm for g++
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _name_x = (int) ((float) _radius * 1.5) - (_name_width / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                           _met_width = font_text_width(_met_font, _met_string_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Convenience routine for setting both locations at once.
                                                                                                                                                                                                                                             _name_width = font_text_width(_name_font, temp_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Determines a default location for the name string.
                                                                                                                                       strncpy(temp_str, &(_name_ptr[widest_start_index])
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Determines a default location for the MET string.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void OperatorObject::set_default_name_location() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void OperatorObject::set_default_text_location() {
                                                                                                                                                                                                                                                                                                                 _name_height = temp_height * (num_breaks + 1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void OperatorObject::set_default_met_location() {
                                                                                                                                                                                                                                                                                    temp_height = font_text_height(_name_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                           _met_height = font_text_height(_met_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _met_x = (2 * _radius) -(_met_width / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _name_x = _radius - (_name_width / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _name_y = _radius + (_name_height / 2);
                                                                                                                                                                                                          temp_str[widest_string] = '\0';
                                                                      widest_string = str_len;
                                                                                                                                                                                                                                                                                                                                                                                        if(_met != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    set_default_name_location();
   if(widest_string == 0) {
   widest_start_index = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 set_default_met_location();
                                                                                                                                                                             widest_string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _met_height = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(_is_terminator)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _met_width = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _met_y = -5;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  else {
```

```
XFillRectangle(_display_ptr, *_drawing_area_pixmap,draw_contert,
_x + COMPOSITE_SPACE, _y + COMPOSITE_SPACE,
(_radius * 3)-(COMPOSITE_SPACE*2),
(_radius * 2)-(COMPOSITE_SPACE*2));
                                                                                                                                                                                                                                                                                            draw_handles(_graphics_context, xM_pos - HANDLESIZE,
                                                                                                                                                                                                                          if((_met_selected) && (_met_handles_drawn == true) &&
draw_handles(_graphics_context, xM_pos - HANDLESIZE,
   yM_pos - _met_height - HANDLESIZE,
   xM_pos + _met_width + HANDLESIZE,
   yM_pos + HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XFillRectangle(_display_ptr, _draw_uindow, draw_context,
_x + COMPOSITE_SPACE, _y + COMPOSITE_SPACE,
(_radius * 3)-(COMPOSITE_SPACE*2),
(_radius * 2)-(COMPOSITE_SPACE*2);
                                                                                                                                                                                                                                                                                                                       yM_pos - _met_height - HANDLESIZE,
xM_pos + _met_width + HANDLESIZE,
yM_pos + HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void Operator Object::draw (DRAW_STYLE style) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XSetForeground(_display_ptr, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              draw_context = _graphics_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           draw_context = _dotted_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          draw_context = _erase_context;
                                                                                                                                                                                                                                                                                                                                                                                                                             _met_handles_drawn = false;
                                                                                                                             _met_handles_drawn = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _op_handles_drawn = false;
*/
                                                                                                                                                                                                                                                              (style == ERASE)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(_is_deleted == false) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (_is_composite) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(style == DOTTED)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(_is_terminator) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Draws the operator.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _color_table[_color]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(style == SOLID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(style != DOTTED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(style == SOLID) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(style == ERASE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GC draw_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            6186
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    write_block(draw_context, xN_pos, yN_pos, _name_ptr, _name_height);
if((_name_selected) && (_name_handles_dravn == false) &&
    (style == SULID)) {
                                                                                            // appropriate. Since handles are drawn in exclusive-or mode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ADrawString(_display_ptr, *_drawing_area_pixmap,
draw_context, xM_pos, yM_pos, _met_string_ptr,
                                                              Writes text on the drawing canvas, including handles if
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if((_name_selected) && (_name_handles_drawn == true) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            strlen(_met_string_ptr));
if((_met_selected) && (_met_handles_drawn == false) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    draw_handles(_graphics_context, xN_pos - HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XDrawString(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw_handles(_graphics_context, xN_pos - HANDLESIZE,
   yN_pos - _name_height - HANDLESIZE,
   xN_pos + _name_width + HANDLESIZE,
   yN_pos + HANDLESIZE);
   _name_handles_drawn = true;
                                                                                                                          // it's important to make sure that they aren't redrawn
                                                                                                                                                           // unless they've been erased or they need to be erased.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     yN_pos - _name_height - HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          xN_pos + _name_width + HANDLESIZE,
yN_pos + HANDLESIZE);
                                                                                                                                                                                                                             void OperatorObject::draw_text(DRAW_STYLE style) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 xM_pos, yM_pos, _met_string_ptr,
strlen(_met_string_ptr));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if((style == SOLID) || (style == DOTTED))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  set_font(draw_context, _met_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             draw_context = _graphics_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              set_font(draw_context, _name_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             draw_context = _erase_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _name_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(_met != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (style == SOLID)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (style == ERASE)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                xN_pos = _x + _name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                     yN_pos = _y + _name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         xM_pos = _x + _met_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             yM_pos = _y + _met_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(style == ERASE)
                                                                                                                                                                                                                                                                                                                                                           xM_pos, yM_pos;
                                                                                                                                                                                                                                                                                                                             int xN_pos, yN_pos,
                                                                                                                                                                                                                                                           GC draw_context;
```

```
XFillArc(_display_ptr, *_drawing_area_pixmap
                                                                                                                                                                                                                                                                                                                                                      draw_contest, _x + COMPOSITE_SPACE,
_y + COMPOSITE_SPACE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XDrawArc(_display_ptr, *_drawing_area_pixmap,
                  /* An Operator, not a Terminator */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XDrawArc(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _r, _y, _radius * 2, _radius * 2, CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                               draw_context, _x + COMPOSITE_SPACE, _y + COMPOSITE_SPACE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XSetForeground(_display_ptr, draw_context,
                                                                                                                                                                                                                                                                           _radius - COMPOSITE_SPACE) * 2,
                                                                                                                                                                                                                                                                                                                                                                                                    (_radius - COMPOSITE_SPACE) * 2,
(_radius - COMPOSITE_SPACE) * 2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                     CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                     CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _color_table[_color]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XDrawArc(_display_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        FULL_CIRCLE);
                                                                                                                                                                       if(style != DOTTED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(style != DOTTED) {
                                                                     if(style == SOLID) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(style == SOLID) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(style == SOLID) {
                                              if(_is_composite) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XSetForeground(_display_ptr, draw_context, _color_table[BLACK]);
                                                                                                                                                                                                                      XFillRectangle(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if((_is_selected) && (_op_handles_drawn == false) &&
MDrawRectangle(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XDrawRectangle(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -x, _y, _radius * 3, _radius * 2);
XFillRectangle(_display_ptr, *_drawing_area_pixmap,
                    _x, _y, _radius * 3, _radius * 2);
XDrawRectangle(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _x, _y, _radius * 3, _radius * 2);
XDrawRectangle(_display_ptr, *_drawing_area_pirmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if((_is_selected) && (_op_handles_drawn == true) &&
                                                                                                                      XSetForeground(_display_ptr, draw_context,
                                                                        draw_context, _x, _y, _radius * 3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  draw_context, _x, _y, _radius * 3, _radius * 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw_handles(_graphics_context, _x, _y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   draw_context, _x, _y, _radius * 3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _op_handles_drawn = true;
                                                                                                                                                                                                                                                                                                                                                      /* atomic */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _op_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (style == SOLID))
                                                                                                                                                                                                                                                                                                                              } /* is_composite */
                                                                                                                                                                                                                                                                                                                                                                                                                                _color_table[_color]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(style != DOTTED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (style == ERASE)) {
                                                                                                                                                                                                                                                                                                                                                                               if(style == SOLID) {
                                                                                                 _radius * 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(style == ERASE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(style == SOLID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               radius * 2);
                                                                                                                                                                                                                                                                                                                                                          else {
```

```
XSetForeground(_display_ptr, draw_context, _color_table[BLACK]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        draw_context, _x, _y, _radius * 2, _radius *2,
CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (_radius - COMPOSITE_SPACE) * 2,
(_radius - COMPOSITE_SPACE) * 2, CIRCLE_BEGIN,
                                                                                                                                                                                                                _y, _radius * 2, _radius * 2, CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        MFillArc(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _draw_window, draw_context,
_op_handles_drawn = false;
```

_x + (3 * _radius), _y + (2 * _radius));

XSetForeground(_display_ptr, draw_context, _color_table[BLACK]);

if(style == SOLID)

```
if(strlen(_name_ptr) != 0)
if(((x >= xN_pos) && (x <= (xN_pos + _name_width))) &&
    (y >= yN_pos - _name_height) && (y <= yN_pos)) {
        _name_selected = true;
        _name_selected</pre>
                                                                                                                                                                                                                                                                                                                                         if(strlen(_met_string_ptr) != 0)
if(((x >= xM_pos) && (x <= (xM_pos + _met_width))) &&
    (y >= yM_pos - _met_height) && (y <= yM_pos)) {</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(_is_terminator) {
   if(((x >= _x) &k (x <= (_x + (3 * _radius)))) &k
   (y >= _y) &k (y <= (_y + (2 * _radius))))</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(((x >= _x) &k (x <= (_x + (2 * _radius)))) &k (y >= _y) &k (y <= (_y + (2 * _radius))))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BOOLEAN OperatorObject::over(int x, int y) {
                                                                                                                                                                                                                                                                                                                   if(_met_string_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(strlen(_name_ptr) != 0)
                                                                                                                                                                                                                                                                                                                                                                                                                    _met_selected = true;
                                                                                                                       if(_name_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(_name_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       N_pos = _y + _name_y;
xM_pos = _x + _met_x;
yM_pos = _y + _met_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        xN_pos = _x + _name_x;
  yM_pos = _y + _met_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                 return true;
                                                                                                                                                                                                                                                 return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      xM_pos, yM_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int xN_pos, yN_pos,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return true;
                                                                 return false;
                                                 if(_is_deleted)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(_is_deleted)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
                                                                                                                     XSetForeground(_display_ptr, draw_context, _color_table[BLACK]);
                                                                                                                                                                    draw_context, _x, _y, _radius * 2, _radius *2,
GIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Returns true if the coordinates are located within either
                                                                                                                                                                                                                                                                                                                                                                                             if((_is_selected) && (_op_handles_drawn == true) &&
                        draw_context, _x, _y, _radius * 2,
_radius * 2, CIRCLE_BEGIN, FULL_CIRCLE);
                                                                                                                                                                                                                                                                                                                                           if((_is_selected) && (_op_handles_drawn == false) &&
(style == SOLID)) {
XFillArc(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                        XDrawArc(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN OperatorObject::hit(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // the operator or one of its text strings.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void OperatorObject::erase_text() {
                                                                                                                                                                                                                                                                                                                                                                                                                                          _op_handles_drawn = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             void OperatorObject::erase() {
                                                                                            if(style == SOLID) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               xN_pos = _x + _name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     yN_pos = _y + _name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            xM_pos = _x + _met_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             xM_pos, yM_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              draw_text(style);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int xN_pos, yN_pos,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  draw_text(ERASE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             draw(ERASE);
```

```
XYPAIR temp_pair, obj_center;
                                                                                                                                                                                                                temp_pair.y = _y;
                                                                                                                                                                                                                                                                                                                                                                                                                          temp_pair.x = _x;
                                                       obj_center = center();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                  if(x <= _x)
                                                                                                                                                                                      if(y <= _y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _y += y;
if(_x < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       \underline{x} = 0;
if(\underline{y} < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          -y = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                    0180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             t # #
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             else {
if(((x >= xN_pos) && (x <= (xN_pos + _name_width)) &&
    (y >= yN_pos - _name_height) && (y <= yN_pos)) {
    return true;</pre>
                                                                                                                                                                                 if(((x >= xM_pos) \&k (x <= (xM_pos + _met_width))) \&k (y >= yM_pos - _met_height) \&k (y <= yM_pos)) {}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // circumference of the operator where streams should begin
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Given the last coordinate, returns the point on the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Returns the coordinates of the center of the given
                                                                                                                                                                                                                                                                                                           if([is_terminator) {
   if(((x >= _x) &k (x <= (_x + (3 * _radius)))) &k
   (y >= _y) &k (y <= (_y + (2 * _radius))))</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if(((x >= _x) && (x <= (_x + (2 * _radius)))) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_pair.x = _x + (int) ((float) _radius * 1.5);
temp_pair.y = _y + _radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (y >= _y) && (y <= (_y + (2 * _radius))))
return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XYPAIR OperatorObject::intercept(int x, int y) {
   int distance;
                                                                                                                               if(_met_string_ptr != NULL) {
  if(strlen(_met_string_ptr) != 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XYPAIR OperatorObject::center() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_pair.x = _x + _radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_pair.y = _y + _radius;
                                                                                                                                                                                                                                           return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if(_is_terminator) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                  return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return false;
                                                                                                                                                                                                                                                                                                                                                                                                  return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XYPAIR temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         float slope;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // operator.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
```

```
distance = (int) sqrt(((x - obj_center.x) * (x - obj_center.x)) +
                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_pair.x = _x + (_radius * 3);
temp_pair.y = (int) ((float) (temp_pair.x - obj_center.x) *
                                                                                                                                                                             else
    temp_pair.y = _y + (_radius * 2);
temp_pair.x = (int) ((float) (temp_pair.y - obj_center.y) /
    slope) + obj_center.x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (float) (x - obj_center.x));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (y - obj_center.y) * (y - obj_center.y); temp_pair.x = obj_center.x + (int)
                                                       (float) (x - obj_center.x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                slope) + obj_center.y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Relocates the operator to the given position. {\bf x} and {\bf y} // represent the center of the operator.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (((float) _radius/ (float) distance) *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void OperatorObject::set_location(int z, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Moves the operator the given distance.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void OperatorObject::move(int x, int y) {
if(_is_terminator) {
    slope = (float) (y - obj_center.y) /
                                                                               if(fabs(slope) >= (2.0 / 3.0)) {
```

```
// When the handle is dragged, the operator is resized.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(((_x + 3 * _radius - HANDLESIZE) <= x) &&
(x <= (_x + 3 * _radius)) &&
    (_y <= y) && (_y <= (_y + HANDLESIZE))) {</pre>
                                                                                                                                                                                                                                                                 if(((_x + 2 * _radius - HANDLESIZE) <= x) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void OperatorObject::move_handle(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //used to eliminate "floating" due to roundoff
                                                                                                                                                                                                _handle_selected = UPPERRIGHT;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(_handle_selected == UPPERLEFT)
(y <= (_y + 2 * _radius))) {
    handle_selected = LOWERLEFT;</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _x += 3 * radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _x += 2 * radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _y += 2 * radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _radius -= radius_change;
if(_radius >= MINRADIUS) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int radius_change = y / 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _handle_selected = NONE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(_is_terminator)
                                                                                                if(_is_terminator) {
                                                                                                                                                                                                                         return true;
                                                                                                                                                                                                                                                                                                                                                                                                   return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return true;
                                                   return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   draw(DOTTED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (y <= y) && (y <= (y + HANDLESIZE)) {
                                                                                                                                                                                                                                                                                          // Included for symmetry. Streams delete themselves when
// their operators are deleted, so this function is included
                                                                                                                                                                                                                                                                                                                                                                                          void OperatorObject::delete_notify(CLASS_DEF class_type,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // Returns true if one of the handles is in the given
                                                                                                                                                                                                                                                                                                                                                                                                                  OP_ID deleted_object_id) {}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                BOOLEAN OperatorObject::hit_handle(int x, int y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if((\underline{x} < \pi x) kk (x < (\underline{x} + HANDLESIZE)) kk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if((\underline{x} < \underline{x} ) kk (\underline{x} < (\underline{x} + HANDLESIZE)) kk ((\underline{y} + 2 * \underline{x} adius - HANDLESIZE) < \underline{y} kk
                    _x = x - (int) ((float) _radius * 1.5);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void OperatorObject::name(char *new_name) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void OperatorObject::unselect() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _handle_selected = UPPERLEFT;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _name_ptr = dup_str(new_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void OperatorObject::select() {
                                                                                                                                                                                                                    reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                         // for possible future use.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _is_selected = false;
_name_selected = false;
_met_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _is_selected = true;
                                                                   _x = x - _radius;
if(_is_terminator)
                                                                                                _radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free(_name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      draw(SOLID);
                                                                                           y = y - x
if(x < 0)
                                                                                                                                                            if(_y < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // location.
                                                                                                                                          x = 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           erase();
```

```
void OperatorObject::reset_handles_drawn_state() {
                                                                                                                                                                                               void OperatorObject::move_text(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if((class_type == OPERATOROBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int OperatorObject::text_height() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // Handles undeleted operators.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (deleted_obj_id == _id)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _neme_handles_drawn = false;
_met_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _op_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          handle_selected = NONE;
              _name_font = font_id;
                                                             _met_font = font_id;
                                                                                      set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                if (_met_selected) {
                                                                                                                                                                                                                                                                 if (_name_selected) {
    _name_x += x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return _name_height;
if(_name_selected)
                                           if(_met_selected)
                                                                                                                                                    // Moves the text.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(_name_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _name_selected
                                                                                                                                                                                                                                                                                                                                                                                                     _met_x += x;
                                                                                                                                                                                                                                                                                                                                                                                                                           _met_y += y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _met_selected
                                                                                                                                                                                                                                                                                                            _name_y += y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _is_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _is_deleted
                                                                                                                                                                                                                                            erase_text();
                                                                                                                                                                                                                                                                                                                                                              e1se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Changes the MET to that entered in the properties dialog
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Places the text in default location. May not be desired.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7/ 04
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               woid OperatorObject::set_object_font(int font_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // Changes the font of the selected text string.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void OperatorObject::set_met(int met, int unit) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free(met_string_ptr);
met_string_ptr = time_with_units(met, unit);
set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                         if(_handle_selected == LOWERLEFT) {
                                                                                                                                                                                                                                                                   if(_handle_selected == LOWERRIGHT) {
    _radius += radius_change;
    if(_radius < MINRADIUS)</pre>
                                                                              if(_handle_selected == UPPERRIGHT) {
   _radius -= radius_change;
if(_radius >= MINRADIUS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _x -= 3 * radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _x -= 2 * radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _radius -= radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                           _radius += radius_change;
if(_radius >= MINRADIUS) {
                                                                                                                                                                                                                                                                                                                                     _radius -= radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          set_default_text_location();
                                                                                                                                   _y += 2 * radius_change;
else
                                                                                                                                                                                                 _radius += radius_change;
                    _radius += radius_change;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(old_met == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      set_default_met_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if(_is_terminator)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int old_met = _met;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _met_unit = unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      met;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw(DOTTED);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      e]se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      :
```

```
// @5
// @2
                                                                                                                                                                                                                                                                                                                                                                              // correct met if wrong
// SDE status is overwritten
                                                                                                                                                                                                                                                                                                                                                                                                                    _timer_op_list = dup_str(op->timer_op_list);
_key_word_list = id_list_copy(op->key_word_list);
_operator_informal_desc = dup_str(op->operator_informal_desc);
_operator_formal_desc = dup_str(op->operator_formal_desc);
                                                                                                                                                                                                                                                                                                                                                                = id_list_copy(op->trigger_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = dup_str(op->operator_impl_lang);
= op->is_composite;
                                                                                                              = id_list_copy(op->period_requts);
                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(op->output_guard_list);
                                                                                                                                                                                                                                                                                                                         = id_list_copy(op->trigger_set);
= dup_str(op->if_condition);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // kbm
                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(op->exception_list);
                                                         = id_list_copy(op->met_requts);
                                                                                                                                                                                                                                                                                    = id_list_copy(op->mcp_requts);
                                                                                                                                                                                                                              = id_list_copy(op->mrt_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // @E
                                                                                                                                                                      = id_list_copy(op->fw_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str(_name_ptr);
                                                                                                                                                                                                                                                                                                      = op->trigger_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void OperatorObject::write_to(OPERATOR on) {
                                                                                         = op->period_unit;
                   = op->met_x_offset;
                                      = op->met_y_offset;
                                                                                                                                                                                                         = op->mrt_unit;
                                                                                                                                                                                                                                                                   = op->mcp_unit;
                                                                                                                                             = op->fw_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     is_terminator(op->is_terminator);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = _op_num;
set_met(op->met, op->met_unit);
                                                                           = op->period;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = NONE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    on->label_font = _name_font;
                                                                                                                                                                                         = op->mrt;
                                                                                                                                                                                                                                                 = ob->mcb;
                                                                                                                              = op->fu;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                             _trigger_if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     on->y = _y;
on->radius = _radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _operator_impl_lang
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               on->color = _color;
                                                                                                                                                                                                                                                                                                                                                                                _output_guard_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _handle_selected
                                                                                                                                                                                                                                                                                                                                                                  _trigger_requts
                                                                                                                                                                                                                                                                                                                                                                                                      _exception_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _name_selected
                                                                                                              _period_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _met_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                on->id = _id;
                                                                                                                                                                                                                                                                                                          _trigger_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _is_composite
                                                                                            _period_unit
                                                                                                                                                                                                                                                                                                                           trigger_set
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _is_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       'x' = x<-uo
                                                        _met_reqmts
                                                                                                                                                                                                                                                                                      _mcp_requts
                                                                                                                                                                                                                                _mrt_requts
                                                                                                                                                                        fw_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    mnu-do<-uo
                                                                                                                                                                                                             _mrt_unit
                                                                                                                                                                                                                                                                   _mcp_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                on->label
                                                                                                                                                 fv_unit
                                                                           period.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          is_nev
                                      _met_y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // 45
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void OperatorObject::set_handle_selected(int handle) {
                                                                                                                                                                                                                                                                                                                                                                  void OperatorObject::text_locate(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if(_name_selected) {
    _name_x = (x - _x) - (_name_width / 2);
    _name_y = (y - _y) + (_name_height / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void OperatorObject::read_from(OPERATOR op) {
                                                                                                                                                                                                                                                                                                                           // Moves the text to the desired location.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = dup_str(op->label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = op->timing_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = op->label_x_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = op->label_y_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                    _met_x = (x - _x) - (_met_width / 2);
_met_y = (y - _y) + (_met_height / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = op->label_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = ob->op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = op->met_font;
                                                                                                              int OperatorObject::text_width() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = op->radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = op->color;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _handle_selected = handle;
                     return _met_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = op->id;
                                                                                                                                                                                                                                return _met_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = ob->x:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = op->y;
                                                                                                                                                                      return _name_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _is_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                     if(_met_selected) {
                                                                                                                                                                                                           if(_met_selected)
 if(_met_selected)
                                                                                                                                                     if(_name_selected)
                                                         return 0;
                                                                                                                                                                                                                                                                     return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _timing_type_
_met_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _name_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               "ob_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 name_x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    radius
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _name_y
                                        61se
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _color_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                e1se
                                                                                                                                                                                           else
```

```
_trigger_set = NULL;
_trigger_reqmts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _period_reqmts = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _key_word_list = NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _met_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _mrt_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _mcp_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _fw_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       roid OperatorObject::copy(OperatorObject *src) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = dup_str(src->_name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   src->_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = src->_name_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = src->_name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = src->_name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = src->_radius;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            id_list_release(_trigger_requts);
id_list_release(_key_word_list);
                                                                                                    = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  id_list_release(_period_requts);
                                                                                                                                                                              = NULL;
                                                                                                                                                                                                                                                          = NULL;
                                                                                                                                                                                                                                                                                                                                    = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                 = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _operator_informal_desc = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = NULL:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = src->_color;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      id_list_release(_trigger_set);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free(_operator_informal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        id_list_release(_met_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    id_list_release(_mrt_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            id_list_release(_mcp_requts);
                                                                                                                                                      free(_trigger_if_condition);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free (_operator_formal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            id_list_release(_fw_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free(_operator_impl_lang);
                                                                                                                                                                                                                                  free(_output_guard_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = src->_id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = SIC->_X;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = src->_y;
                                                                       free(_met_string_ptr);
                                                                                                                                                                                                                                                                                                               free (_exception_list);
                                                                                                                                                                              _trigger_if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _operator_formal_desc
                                                                                                                                                                                                                                                                                                                                                                                         free(_timer_op_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _operator_impl_lang
                                                                                                                                                                                                                                                             _output_guard_list
free(_name_ptr);
                                                                                                                                                                                                                                                                                                                                           _exception_list
                                                                                                         _met_string_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                     _timer_op_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _name_y
_timing_type
_met_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            name_font
                          _name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      name_x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             radius
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          color
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         j.d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          printf("OperatorObject::release called for: %s\n", _name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  on->operator_informal_desc = dup_str(_operator_informal_desc);
on->operator_formal_desc = dup_str(_operator_formal_desc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   on->operator_impl_lang = dup_str(_operator_impl_lang);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  on->output_guard_list = dup_str(_output_guard_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         on->trigger_set = id_list_copy(_trigger_set);
on->if_condition = dup_str(_trigger_if_condition);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              on->trigger_reqmts = id_list_copy(_trigger_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            on->key_word_list = id_list_copy(_key_word_list);
                                                                                                                                                                                                                                                                                  on->period_unit = _period_unit;
on->period_requts = id_list_copy(_period_requts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            on->exception_list = dup_str(_exception_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               on->timer_op_list = dup_str(_timer_op_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                           on->mrt_unit = _mrt_unit;
on->mrt_reqmts = id_list_copy(_mrt_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       on->mcp_unit = _mcp_unit;
on->mcp_requts = id_list_copy(_mcp_requts);
                                                                                                                                                                                                                                  on->met_reqmts = id_list_copy(_met_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                         on->fw_reqmts = id_list_copy(_fw_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             on->is_terminator = _is_terminator;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    on->trigger_type = _trigger_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     on->is_composite = _is_composite;
                                                                            on->timing_type = _timing_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       on->is_new = _is_new;
on->is_modified = _is_modified;
on->is_deleted = _is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             roid OperatorObject::release() {
on->label_x_offset = _name_x;
on->label_y_offset = _name_y;
                                                                                                                                                                              on->met_x_offset = _met_x;
on->met_y_offset = _met_y;
                                                                                                                              on->met_unit = _met_unit;
on->met_font = _met_font;
                                                                                                                                                                                                                                                                                                                                                                   on->fw_unit = _fw_unit;
                                                                                                                                                                                                                                                             on->period = _period;
                                                                                                                                                                                                                                                                                                                                                                                                                     on->mrt = _mrt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  on->mcb = mcb;
                                                                                                      on->met = _met;
                                                                                                                                                                                                                                                                                                                                           on->fu = _fu;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #endif
```

= src->_timing_type;

//Added by Dong Lange 9/9/96; kbm 10/24/96

= src->_met_font;

```
_operator_informal_desc = dup_str("");
                                                                                                                                                                                                                                                                                                                            = UNDEFINED_TIME;
                                                                                   = 0;
= dup_str("");
                                                                                                                                                                                             = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = NULL;
= UNDEFINED_TIME;
= UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                        = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                           = MS;
                                                                                                                                                                                                                                                                                                                                                                                                       ≡ MS:
                                                                                                                                                                                                                                                                                            ..
0
H
                                                                    :0 =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _trigger_if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _operator_formal_desc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     is_terminator(false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _operator_impl_lang
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _output_guard_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _handle_selected_name_selected
                                                                                                                                                                                                                                       _met_string_ptr
_met_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _trigger_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          .exception_list
                                                                                                                                                                                                                                                                                                                                                                  period_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            timer_op_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             .key_word_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     trigger_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      is_composite
                                                                                                                                                                                  timing_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _is_modified
                                                                                                                                                                                                                                                                                                                                              _period_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _trigger_set
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             is_selected
                                                                                                                                                                                                                                                                                                             _met_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _mrt_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  .mcp_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                         _fw_reqmts
                                                                                                                            name_font
                                                                                                                                                                                                                     _met_unit
                                                                                                          name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                           _mrt_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _mcp_unit
                                                                                                                                                                                                                                                                                                                                                                                                     fv_unit
                                                                                                                                               name_x
                                                                                                                                                                                                                                                                                                                              _period
                                                                                                                                                                 name_y
                                                                                                                                                                                                                                                                            met_x
                                                                                         color
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _operator_informal_desc = dup_str(src->_operator_informal_desc);
_operator_formal_desc = dup_str(src->_operator_formal_desc);
                                                                                                                                                                                                                                                                                                                                                                  = dup_str(src->_trigger_if_condition);
= id_list_copy(src->_trigger_reqmts);
                                                                                                                         = src->_period_unit;
= id_list_copy(src->_period_requts);
                                                                                                                                                                                                                                                                                                                                                                                                                                        = dup_str(src->_timer_op_list);
= id_list_copy(src->_key_word_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str(src->_operator_impl_lang);
                                                                                                                                                                                                                                                                                                                                                                                                     = dup_str(src->_output_guard_list);
                                                                                                                                                                                                                                                                                                                                                  = id_list_copy(src->_trigger_set);
                                                                                                                                                                                                                                                                                                                                                                                                                        = dup_str(src->_erception_list);
                                  = dup_str(src->_met_string_ptr);
                                                                                        = id_list_copy(src->_met_reqmts);
                                                                                                                                                                                                                                                         = id_list_copy(src->_mrt_reqmts);
                                                                                                                                                                                                                                                                                                           = id_list_copy(src->_mcp_reqmts);
                                                                                                                                                                                                 = id_list_copy(src->_fw_reqmts);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = src->_name_handles_drawn;
= src->_met_handles_drawn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = src->_op_handles_drawn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = src->_handle_selected;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = src->_is_terminator;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = src->_name_selected;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = src->_is_composite;
                                                                                                                                                                                                                                                                                                                              = src->_trigger_type;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = src->_met_selected;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = src->_is_modified;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = src->_is_selected;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = src->_name_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = src->_is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = src->_name_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = src->_met_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = src->_met_width;
                  = src->_met_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = src->_is_new;
                                                                                                                                                                                                                                       = src->_mrt_unit;
 # src->_met;
                                                                                                                                                                                                                                                                                            = src->_mcp_unit;
                                                                                                                                                                                  = src->_fw_unit;
                                                                                                          = src->_period;
                                                     m src->_met_x;
                                                                    = src->_met_y;
                                                                                                                                                                                                                        = src->_mrt;
                                                                                                                                                                                                                                                                            = src->_mcp;
                                                                                                                                                               = src->_fw;
                                                                                                                                                                                                                                                                                                                                                                  trigger_if_condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _operator_impl_lang
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _name_handles_drawn
                                                                                                                                                                                                                                                                                                                                                                                                     .output_guard_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _met_handles_drawn
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _op_handles_drawn
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            handle_selected
                                  _met_string_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                         exception_list
                                                                                                                                                                                                                                                                                                                                                                                     trigger_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                            timer_op_list
                                                                                                                                               period_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                            _key_word_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _name_selected
                                                                                                                                                                                                                                                                                                                                 trigger_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               is_composite
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               met_selected
                                                                                                                                                                                                                                                                                                                                                  trigger_set
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           is_selected
                                                                                                                           _period_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      name_height
                                                                                         met_requts
                                                                                                                                                                                                                                                           mrt_requts
                                                                                                                                                                                                                                                                                                               mcp_requts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    name_width
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _met_height
                                                                                                                                                                                                      fw_reqmts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _met_width
                                                                                                                                                                                                                                                                                           _mcp_unit
                  met_unit
                                                                                                                                                                                                                                       mrt_unit
                                                                                                                                                                                  fv_unit
                                                                                                        -period
                                                      met_x
```

= GraphObject::_default_font;

= UNDEFINED_OPNUM;

= GraphObject::_default_font;

= NULL;

= MS:

= NULL;

= dup_str("");

= NTC:

set_text_dimensions();

= false; = false;

_met_selected

void OperatorObject::initialize() {

= NONE;

= dup_str(DEFAULT_IMPL_LANG);

= false; = false; = false;

= dup_str("")

= NULL;

= dup_str(""); = NULL;

= dup_str(""); = dup_str(""); = dup_str("");

= UNPROTECTED;

= NULL;

= NULL;

```
set_met(0, MS);
}
else {
  /* Do not change if not zero */
  if (_met == 0) {
      set_met(UNDEFINED_TIME, MS);
  }
}
                                                                                                                                                        void OperatorObject::is_terminator(BOOLEAN is_terminator) {
                                                                                                                                                                                            _is_terminator = is_terminator;
        set_default_text_location();
set_default_met_location();
reset_handles_drawn_state();
                                                                                                                                                                                                                               if (_is_terminator) {
```

#include <Xm/Xm.h>
#include "operator_object.h"

#ifndef OPERATOR_PROPERTY_MENU_H #define OPERATOR_PROPERTY_MENU_H

int x, int y, BOOLEAN parent_terminator, ID_LIST avail_impl_langs, GraphObjectList *graphic_list);

#endif /* OPERATOR_PROPERTY_MENU_H */

•				
* Pro	Project:	PSDL Editor	* Get rid of op_being_updated from graph_editor and pass it	11 to
* Ass	Assembly:	GUI (Graphics User Interface)	* operator_property_dialog as an argument.	
* Sub	SubAssem:	Operator Properties		
*			***************************************	****
* Pro	Programmer:	Ken Moeller		
* Lan	Langauge:	C++		
*			#include <malloc.h></malloc.h>	
* Des	cription:		#include <memory.h></memory.h>	
*	window for	window for displaying and maintaining the properties of an operator.		
*	operator_		#include <x11 xatom.h=""></x11>	
*	routines	routines are also provided.	#include <xm drawinga.b=""></xm>	
*				
	The Opera	The OberatorObject that is being undated is provided by		
	on heine	the first induction is a dishal combol of is a system to		
	be get no	Opposite the set of the constant of the set		
	7			
* Modi	Modules:			
* ope1	operator_name_cb	qo	#include <xm scrolledw.h=""></xm>	
	met cb			
*	met unit ch			
*	period cb			
	neriod unit ch	it ch		
	fy cb		#include <xm togglebg.b=""></xm>	
*	fy unit cb	م.		
	men eb	•		
	mcp unit cb	ą	#include "ge defs.h"	
	mrt ch	1		
	mrt unit ch	ą.		
	operator_ok_cb	ok_cb		
	operator	operator_cancel_cb		
	operator_help_cb	help_cb	#include "graph_object_list.h"	
	operator	operator_property_dialog	#include "operator_object.h"	
			#include "operator_property_menu.h"	
			#include "warning.h"	
4 G101	Globals/Static:	••	#include "windows.h"	
			#include "action_area.h"	
_	op_being_updated	updated	#include "build_option.h"	
			Doming Using Son Demandary	
	orur-do-dman		#Astine UTN UTDIR 390	
	on dialog		-	
			TAB1	
Hist	History:		#define TAB2 20	
			TAB3	
PI 4	Date	Author Change		
10	yy/mm/dd	Ken Moeller	TABS	
			#define TABS 283	
_			IAB_LABEL	

* Suggested Modifications:

```
if (id_list_ptr != NULL) {
   id_list_str_eps(id_list_ptr, &stream_list_ptr,25);
   memcpy(buffer, stream_list_ptr, strlen(stream_list_ptr));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void id_list_dialog(Widget parent, XtPointer id_list_ptr,
XtPointer display_cb, Widget disp_widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void trigger_label(Widget disp_w, ID_LIST id_list_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void req_by_label(Widget disp_w, ID_LIST id_list_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              <u>:</u>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           <u>..</u>
                                                                                                                                                                           BOOLEAN op_name_error, op_met_error, op_period_error,
                                                                                                                                                                                                     op_mcp_error, op_fw_error;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               typedef void (*display_fun)(Widget, Widget_Data_Ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtVaSetValues(disp_v, XmNlabelString, tmp , NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                tmp = XmStringCreateSimple("Required By ...
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     static void display_timing(int timing_type);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             tmp = XmStringCreateSimple("Required By
                        GraphObjectList *opDialogGraphicList;
                                                                                                                                                                                                                                                                                                                                                                                                                              } Widget_Data_Node, *Widget_Data_Ptr;
                                                                 char* if_condition_prefix = NULL;
char* output_guard_prefix = NULL;
char* exception_prefix = NULL;
char* timer_op_prefix = NULL;
                                                                                                                                                                                                                                                                     ID_LIST Global_avail_impl_langs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char *stream_list_ptr = NULL;
                                                                                                                                                                                                                                                                                                             typedef struct widget_data {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (id_list_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                        Widget widget;
ID_LIST* id_list_adr;
                                                                                                                                                                                                                                                                                                                                                                                                         disp_widget;
                                                                                                                                                                                                                                                                                                                                                                                   display_cb;
                                                                                                                                                                                                     op_mrt_error,
                                                                                                                                  char* timer_op_prefix
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char buffer[27] = "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                           Widget
                                                                                                                                                                                                                                                                                                                                                                                   void*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         6156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Widget trigger_if_cond, trigger_if_value = NULL;
Widget trigger_req_by;
Widget trigger_req_by;
Widget triming;
Widget met_label, met_label, met_label, met_label, met_label, mrt, mrt_unit, mrt_unit_label, period_req_by;
Widget period_label, period, period_unit, pariod_unit_label, mrt_req_by;
Widget mrt_label, mrt, mrt_unit, mrt_unit_label, mcp_req_by;
Widget mrt_label, fw, fw_unit, fw_unit_label, fw_req_by;
Widget fw_label, fw, fw_unit, fw_unit_label, fw_req_by;
Widget output_guard, output_guard_value = NULL;
Widget exception, exception_value = NULL;
Widget timer_op, timer_op_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static OperatorObject *temp_op_info; // Access required in callback routines static Widget op_dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Widget timer_op, timer_op_value = NULL;
Widget spec_keyword_button, spec_informal_button, spec_formal_button;
Widget ok_button, cancel_button, help_button;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  - selectable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             - selectable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Operator or Terminal
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // og Ada, TAE, PSDL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       static Widget impl_lang; // eg
static Widget trigger;
static Widget trigger_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #define TERMINATOR_TYPE 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  static Widget oper_label;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      static Widget oper_name;
990
1170
5 5
6 5
7 125
1125
1125
1185
2260
2260
2260
2260
330
3400
4400
4470
550
550
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #define OPERATOR_TYPE
  TAB_VALUE
                                            #define TAB_REQMT
                        #define TAB_UNIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Operator Type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #define TRIGGER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #define PERIOD
                                                                                                                                                                                                                                                                   RUWIO
                                                                                                                                                                                                                                                                                                                  ROW12
                                                                                                                                                                                                                                                                                                                                        ROW13
                                                                                                                                                                                                                                                                                                                                                            ROW14
                                                                                                                                                                                                                                                                                                                                                                                   ROW15
                                                                                                                                                                                                                                                                                         ROW11
                                                                                                                                                                                                                                                                                                                                                                                                         #define RUW16
                                                                                                                                                    ROWS
                                                                                                                                                                           ROWG
                                                                                                                                                                                                                        ROWS
                                                                                                                                                                                                                                              ROW9
                                                                                     #define ROW2
                                                                                                                                                                                                 ROW7
                                                                   #define ROW1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #define MCP
                                                                                                                                                                                                                                                                                                                                                                                                                                                    #define MET
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #define MRT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #define FW
                                                                                                                                                                                                                          #define
                                                                                                                                                                                                   #define
    #define
                                                                                                                                  #define
                                                                                                                                                      #define
                                                                                                                                                                               #define
                                                                                                                                                                                                                                              #define
                                                                                                                                                                                                                                                                     #define
                                                                                                                                                                                                                                                                                           #define
                                                                                                                                                                                                                                                                                                                  #define
                                                                                                                                                                                                                                                                                                                                        #define
                                                                                                                                                                                                                                                                                                                                                              #define
                                                                                                                                                                                                                                                                                                                                                                                   #define
```

```
id_list_dialog(w, client_data, &keyword_display_cb, w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       id_list_dialog(w, client_data, &req_by_display_cb, w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static void keyword_cb(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                static void req_by_cb(Widget w, XtPointer client_data,
                                                                                                      XtVaSetValues(disp_w, XmNlabelString, tmp , NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                         ID_LIST* id_list_adr = client_data->id_list_adr;
Widget disp_v = client_data->disp_widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ID_LIST* id_list_adr = client_data->id_list_adr;
Widget disp_w = client_data->disp_widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ID_LIST* id_list_adr = client_data->id_list_adr;
Widget disp_v = client_data->disp_widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtPointer cb_struct_ptr) {
                                 tmp = XmStringCreateSimple(" Formal Desc
                                                                                                                                                                                                                                                                                                                      static void trigger_display_cb(Widget w,
Widget_Data_Ptr client_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static void keyword_display_cb(Widget w,
Widget_Data_Ptr client_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static void req_by_display_cb(Widget w,
Widget_Data_Ptr client_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               trigger_label(disp_w, *id_list_adr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  keyword_label(disp_w, *id_list_adr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 req_by_label(disp_w, *id_list_adr);
                                                                                                                                                                           XmStringFree(tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      disp_w
                             XtVaSetValues(disp_v, XmNalignment, XmALIGNMENT_CENTER, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if ((*char_ptr_adr != NULL) && (**char_ptr_adr != '\0'))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if ((*char_ptr_adr != NULL) && (**char_ptr_adr != '\0'))
tmp = XmStringCreateSimple(" Formal Desc...");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void informal_label(Widget disp_w, char** char_ptr_adr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void keyword_label(Widget disp_w, ID_LIST id_list_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void formal_label(Widget disp_w, char** char_ptr_adr) {
                                                                                                                                                                                                                                                                                                                   XtVaSetValues(disp_w, XmNlabelString, tmp , NULL);
XtVaSetValues(disp_w, XmNwidth, 170, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(disp_w, XmNlabelString, tmp , NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(disp_w, XmNlabelString, tmp , NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              tmp = XmStringCreateSimple("Informal Desc...");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             tmp = XmStringCreateSimple(" Informal Desc ");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      tmp = XmStringCreateSimple(" Keywords ... ");
                                                                                                                                                                        tmp = XmStringCreateSimple("Stream List");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               tmp = XmStringCreateSimple(" Keywords
tmp = XmStringCreateSimple(buffer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (id_list_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                XmStringFree(tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringFree(tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmString tmp;
```

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false); n++;
XmMULT_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     static void op_prop_formal_desc_ok_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtSetArg(args[n], XmNvalue,
tert_v = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                      XtSetArg(args[n], XmNeditable,
true); n++;
XtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                           true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                    true); n++;
                                                                                                                                                                                    12); n++;
                                                                                                                                                                                                                       70); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                action_a = CreateActionArea(pane, action_items,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_op_info->operator_formal_desc_adr());
                                                           text = temp_op_info->operator_informal_desc();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op_info->operator_formal_desc(text);
                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                           XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              formal_label(spec_formal_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtDestroyWidget(GetTopShell(w));
                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                         XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                          XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                    XtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KtManageChild(text_w);
XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                clear_status();
                                                                                                                                                      Arg args[10];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            "op_prop_informal_desc.hlp" }
                                                                                     static void op_prop_informal_desc_ok_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     string = XmStringCreateSimple("Enter or Edit Informal Description");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                    XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  static void informal_desc_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                     informal_label(spec_informal_button,
temp_op_info->operator_informal_desc_adr());
                                                                                                                                                                                                                                                                                        temp_op_info->operator_informal_desc(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNtitle, "Informal Design Description",
                                                                                                                                                                                                                                                           char *text = XmTextGetString(text_W);
                                                                                                                                                      Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                       XtDestroyWidget(GetTopShell(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         {"Cancel", close_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNlabelString, string,
                                                                                                                            XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsashWidth,
                                                                                                                                                                                                                                                                                                                               free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char *text;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  {"Help",
```

```
action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (XmStringGetLtoR(strlist[0], XmSTRING_DEFAULT_CHARSET, &text)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Widget list_w = ((Widget_Data_Ptr) client_data)->widget;
ID_LIST* id_list_adr = ((Widget_Data_Ptr) client_data)->did_list_adr;
void* display_cb = ((Widget_Data_Ptr) client_data)->display_cb;
Widget disp_uidget = ((Widget_Data_Ptr) client_data)->display_cb;
XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                        static void trigger_list_cb(Widget w, AtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      static void id_list_ok_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       id_list_dialog(w, client_data, ktrigger_display_cb, w);
                                                                   //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              for (int i = 1; i < u_bound; i++) {
   idp->next = (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 idp_head = (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                            XtPointer cb_struct_ptr)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     display_fun df = (display_fun) display_cb;
                                                                                            action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          idp, idp_head;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  fra_bound,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Estrlist,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               *strlist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtPointer call_data) {
                                                                                                                                                                                                                                                    XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                punoq n
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *text;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaGetValues(list_w,
                                                                                                                                                                                                                     XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNitemCount,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               idp->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         idp->id = text;
  XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (u_bound > 0) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                idp = idp_head;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNitems,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         action_items[1].data = (XtPointer)dialog;//Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      false); n++;
XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                          "op_prop_formal_desc.hlp"
                                                                                                                                                                                                                                                                                                                                                                                                       dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    string = XmStringCreateSimple("Enter or Edit Formal Description");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
static void formal_desc_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              text); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (2); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              70); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                      w. XmNtitle, "Formal Design Description", XmNdeleteResponse, XmDESTROY,
                                                           Widget dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         text = temp_op_info->operator_formal_desc();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtSetArg(args[n], XmNcursorPositionVisible,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (tSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtSetArg(args[n], XmNcolumns,
                                                                                                                      {"Cancel", close_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Arg args[10];
XtSetArg(args[n], XmNrows,
                                 XtPointer call_data) {
                                                                                                                                                       help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsashWidth,
                                                                                                                                                                                                                                                                                 XmString string;
                                                                                                                                                     {"Help",
                                                                                                                                                                                                                                                                                                                                              char *text;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int n = 0;
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(XmSelectionBoxCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        update_status("ID is a keyword, change or cancel", RING_BELL);
                                                                                                                                                     update_status("ID is a keyword, change or cancel", RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       static void edit_id_cb(Widget widget, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (XmStringGetLtoR(cbs->value, XmSTRING_DEFAULT_CHARSET,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       warning(widget, "Invalid ID");
update_status("Illegal ID: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmListGetSelectedPos(list_w, &pos_list, &pos_cnt);
new_items = XmStringCreateSimple(newtext);
for (i = 0; i < pos_cnt; i++) {
XmListReplaceItemsPos(list_w, &new_items, 1, pos_list[i]);</pre>
                                                                                                                                                                                                                                                                               XmListAddItemUnselected(list_w, cbs->value, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   //check to make sure entry is not null
                                                                                             if (is_keyword(newtext, false)) {
warning(widget, "ID is a keyword");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (is_keyword(newtext, false)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtPointer call_data) {
Widget list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmSelectionBoxCallbackStruct *cbs =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            warning(widget, "ID is a keyword");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ensutext)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (!valid_id(newtext)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          i, *pos_list, pos_cnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmString *strlist,new_items;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (newtext && *newtext){
                                                                                                                                                                                                                                                                                                                                                                                                                                        XtDestroyWidget(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char *text, *newtext;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                            clear_status();
        RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int u_bound;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return;
                                          return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return;
                                                                                                                                                                                             return;
idp = idp->next;
idp->next = NULL;
if (XmStringGetLtoR(strlist[i], XmSTRING_DEFAULT_CHARSET, &text))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (XmSelectionBoxCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static void id_list_cancel_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           static void read_id_cb(Widget widget, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (XmStringGetLtoR(cbs->value, XmSTRING_DEFAULT_CHARSET,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (!valid_id(newtext)) {
    varning(widget, "Invalid ID");
    update_status("Illegal ID: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                (*df)(disp_widget, (Widget_Data_Ptr) client_data);
                                                                                                                                                                                                                                                                                  id_list_replace(id_list_adr, idp_head);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          //check to make sure entry is not null
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtPointer call_data) {
Widget list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AmSelectionBoxCallbackStruct *cbs =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtDestroyWidget(GetTopShell(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        knewtext)) {
                                                                                                                                                                                                                                                                                                                                                                                                         XtDestroyWidget(GetTopShell(W));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (newtext && *newtext){
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free((char*) client_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free((char*) client_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char *text, *newtext;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmString *strlist;
                                                                                                                                                                                       idp_head = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int u_bound;
                                                                                                                                                           } else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return;
```

```
XmSelectionBoxGetChild(dialog, XmDIALUG_HELP_BUTTON), false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtAddCallback(dialog, XmNokCallback, edit_id_cb, list_v);
XtAddCallback(dialog, XmNcancelCallback, dlg_callback, NULL);
                                                                                                                                                                                                      if (!XmListGetSelectedPos(list_w, &pos_list, &pos_cnt)) {
    warning(w, "Nothing Selected");
                                                                                                  t = XmStringCreateSimple("Enter Revised ID");
                                                                                                                                                                                                                                                                                                                                                                      false); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void id_list_dialog(Widget parent, XtPointer id_list_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                 dialog = XmCreatePromptDialog(w, "prompt", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "id_list.hlp"}
                                                                                                                                                                                                                                                                                                                                           XtSetArg(args[n], XmNselectionLabelString, t);
XtSetArg(args[n], XmNautoUnmanage, fals
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        dialog, rc, pane, list, action_a;
count = 0, i, n=0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AtPointer display_cb, Widget disp_widget) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while(idp) { // count number of IDs in list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                idp = (ID_LIST) *((ID_LIST*) id_list_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NULL),
NULL),
                                              list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NULL),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 static ActionAreaItem action_items[] = {
                                                                                                                                                   n = 0, *pos_list, pos_cnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  {"OK", id_list_ok_cb,
{"Cancel", id_list_cancel_cb,
{"Add", id_list_add_cb,
{"Delete", id_list_del_cb,
{"Edit", id_list_edit_cb,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     //Build list for list widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtFree((char*)pos_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *str,string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtManageChild(dialog);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              help_cb,
                                                                                                                          args[5];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  args[5];
                           dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(t);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   idb;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetSensitive(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ("Help",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 count++;
                                                                                               XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ID_LIST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmSelectionBoxGetChild(dialog, XmDIALOG_HELP_BUTTON), false);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtdddCallback(dialog, XmNokCallback, read_id_cb, list_w);
XtdddCallback(dialog, XmNcancelCallback, dlg_callback, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static void id_list_edit_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                    static void id_list_add_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  static void id_list_del_cb(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (!XmListGetSelectedPos(list_w, &pos_list, &pos_cnt)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   false); n++;
                                                                                                                                                                                                                                                                                                                                                                      t = XmStringCreateSimple("Enter New ID");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtSetArg(args[n], XmNselectionLabelString, t); n
XtSetArg(args[n], XmNautoUnmanage, false); n
dialog = XmCreatePromptDialog(e, "prompt", args, n);
                                                                                                                                                                                                                                                                                                                list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtPopup(XtParent(dialog), XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmListDeletePos(list_w, pos_list[0]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          warning(w, "Nothing Selected");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *pos_list, pos_cnt;
                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                               XtDestroyWidget(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtManageChild(dialog);
                                                                                                                                                                                                                                                                                                                                                                                               args[5];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        dialog;
                                                                                                                                                                                                                                                                                          dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(t);
                                                                       clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtSetSensitive(
                                                                                                                                                                                                                                                                                                                                                                      XmString
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return;
                                                                                                                                                                                                                                                                                                                     Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Widget
```

```
else if ((strchr(text,'.') != NULL) && temp_op_info->is_composite()) {
                                                                                                                                                  action_a = CreateActionArea(pane, action_items, %tNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static void operator_cb(Widget w, XtPointer which, XtPointer cbs) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static void operator_name_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          warning(w, "A Composite Operator can not be a Type");
update_status("Composite Operator can not be a Type: "
"rename operator or make Automic",
  // Cancel
// Add
// Del
// Edit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     display_timing(temp_op_info->timing_type());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_op_info->is_terminator( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        } else if ((strchr(text,'.') == NULL) &&
action_items[1].data = (XtPointer)vd;
action_items[2].data = (XtPointer)list;
action_items[3].data = (XtPointer)list;
                                                                                      action_items[4].data = (XtPointer)list;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Widget temp_w = (Widget) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   text = XmTextFieldGetString(temp_W);
                                                                                                                                                                                                                                           XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         op_name_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_name_error = true;
                                                                                                                                                                                                             XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (state->set) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                char *old_name;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RING BELL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  char *text;
                                                                                                                                                                                                                                                                                                      return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Make a client_data structure
Widget_Data_Ptr vd = (Widget_Data_Ptr) malloc(sizeof(Widget_Data_Node));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        //Set client data for "OX", "Cancel", "Add", "Del", and "Edit" buttons
                                                                                                                                                                                                                                                                                                                                  dialog = XtVaCreatePopupShell("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                  str = (XmString *) XtMalloc (count * sizeof (XmString));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    string = XmStringCreateSimple("Enter or Edit IDs");
XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  list = XmCreateScrolledList(rc, "ID_List", NULL, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // OK
                                                                                      idp = (ID_LIST) *((ID_LIST*) id_list_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  wd->widget = list;
wd->id_list_adr = (ID_LIST*) id_list_ptr;
                                                                                                                                                                                                          str[i] = XmStringCreateSimple(idp->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         disp_widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              display_cb;
                                                                                                                                                                                                                                                                                                                                                                                                                        XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   action_items[0].data = (XtPointer)wd;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           count,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                다
(
                                                                                                                                                                                                                                                                                                                                                                                             XmNtitle, "ID List",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     for (i = 0; i < count; i++) {
                                                                                                                                                                               for (i = 0; i < count; i++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           wd->display_cb = (void *)
wd->disp_widget = (Widget)
                                                                                                                                                                                                                                                                                                                                                               XtParent(parent)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNvisibleItemCount,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(str[i]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtManageChild(list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(list,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNitemCount,
        idp = idp->next;
                                                                                                                                                                                                                                        idp = idp->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                      NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNitems,
```

```
static void period_unit_cb(Widget w, XtPointer which, XtPointer cbs) {
    XmToggleButtonCallbackStruct *state =
    (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                       trigger_label(trigger_list, *(temp_op_info->trigger_set_adr()));
                            trigger_list = XtVaCreateManagedWidget(dup_str("Stream List"), xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           static void fw_unit_cb(Widget w, XtPointer which, XtPointer cbs) {
                                                                                                                                                                                                         XtAddCallback(trigger_list, XmNactivateCallback,
                                                                                                                                                                                                                                                                (XtPointer) temp_op_info->trigger_set_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_op_info->period_unit( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info->fw_unit( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_op_info->met_unit( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtDestroyWidget(trigger_list);
trigger_list = NULL;
     if (!trigger_list) {
                                                                                                                                                                                                                                                                                                                                                                                                                                        if (trigger_list) {
                                                                                                                                                                                                                                   trigger_list_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if(state->set)
                                                                                                                                               KmNwidth, 170,
                                                                                                                     XmNy, ROW4+3,
                                                                                         XmNx, TABS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return;
                                                                                                                                                                                                                                                                                                                                                                                                             else {
                                                                                                                                                                            NULL);
!opDialogGraphicList->unique_op_id(text,temp_op_info->id())) {
warning(w, "Simple Operator Names must be unique to level");
update_status("Operators that are not types must have a unique name",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static void impl_lang_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (temp_op_info->trigger_type() != UNPROTECTED) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_op_info->operator_impl_lang(langPtr->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_op_info->set_default_name_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_op_info->trigger_type( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (!old_name || *old_name == '\0')
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           langPtr = Global_avail_impl_langs;
                                                                                                                                                                                                                                                                old_name = temp_op_info->name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int which = (int) client_data; ID_LIST langPtr;
                                                                                                                                                                                                                                                                                                                                                                                                           temp_op_info->name(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    for (i = 0; i < which; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 langPtr = langPtr->next;
                                                                                                                                                                                                                                                                                                                                                 temp_op_info->name("");
                                                                                                                                               op_name_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            op_name_error = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                       if (text == NULL)
                                                                                         RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(old_name);
                                                                                                                   XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtFree(text);
                                                                                                                                                                            return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return;
```

```
warning(w, "Illegal Finish Within");
update_status("Illegal value for Finish Within time "
"(correct value or Cancel); time ::= digit {digit}", RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_op_info->set_met(time_value, temp_op_info->met_unit());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_op_info->set_met(UNDEFINED_TIME,MS); // Clear string
                                                                                                                                                                                                                     reset_met_location = (temp_op_info->met() == UNDEFINED_TIME);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // set string
                                                                        static void read_timing_cb(Widget w, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        op_period_error = read_time_value(period, time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              op_met_error = read_time_value(met, time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   op_fw_error = read_time_value(fw, time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (!temp_op_info->is_terminator()) {
                                                                                                                                                                                                                                                                     switch (temp_op_info->timing_type()) {
                                                                                                                                                                                                                                                                                                                                               if (!temp_op_info->is_terminator())
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op_info->period(time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info->fw(time_value);
                                                                                                                                                                    BOOLEAN reset_met_location;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (op_fw_error) {
                                                                                                                                                  int time_value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         case PERIODIC:
                                                                                                                                                                                                                                                                                                  case NTC:
                                                                                                                                                                                                                                                                                                                                                                                                                           break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           break;
static void mcp_unit_cb(Widget w, XtPointer which, XtPointer cbs) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static BOOLEAN read_time_value(Widget w, int &time) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!valid_integer_literal(text, &time_value)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaSetValues(w, XmNvalue, buffer, NULL);
                                                                                                                       temp_op_info->mrt_unit( (int) which );
                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info->mcp_unit( (int) which );
                                                                                                                                                                                                                                                                                                                        (XmToggleButtonCallbackStruct *) cbs;
                                               (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         sprintf(buffer, "%d", time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (time_value != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // Display new value from latency
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         buffer[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              text = XmTextFieldGetString(W);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        time_value = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN error_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (white_space(text))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        error_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         error_flag = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      error_flag = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             time_value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         time = time_value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return error_flag;
                                                                                              if(state->set)
                                                                                                                                                                                                                                                                                                                                                                        if(state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtFree(text);
                                                                                                                                                                           return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                  return;
```

```
period_label = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                 met_label = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               req_by_label(met_req_by, *(temp_op_info->met_req_by_adr()));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   req_by_cb, (XtPointer) temp_op_info->met_req_by_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     met_unit = time_unit_menu(op_dialog, "unit_box",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               met_unit_label = XmOptionLabelGadget(met_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtAddCallback(met_req_by, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    met_req_by = XtVaCreateManagedWidget(required_by_str,
  == UNDEFINED_TIME)
                                               == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_op_info->met_unit(), met_unit_cb,
                                                                                                                                                                                                                                                                                                                                      met = XtVaCreateManagedWidget("met",
                                                                                                                                                                                                                                                            XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                      xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      op_dialog,
                                                                                                                                                                                           op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      prompt = dup_str("Period:");
                     temp_op_info->mcp_unit(MS);
if (temp_op_info->mrt() == 
                                                                 temp_op_info->mrt_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtManageChild(met_req_by);
                                                                                                                                         prompt = dup_str("MET:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtManageChild(met_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(met_unit);
if (temp_op_info->mcp()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtManageChild(met);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // requirements....
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   TAB_UNIT, ROWS);
                                                                                                                                                                                                            KmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                XmNx, TAB_VALUE,
XmNy, ROW8,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                                                             KmNcolumns, 10,
                                                                                                                                                                                                                                                                                                              free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!period) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KmNx, TAB_REQMT,
                                                                                                                                                                                                                                         KmNy, ROWS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KmNwidth, 120,
                                                                                                                   if (!met) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNy, ROW8+3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                     NULL);
                                                                                                                                                                                                                                                                                      NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NULL);
                                                                                                                   // set string
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_met_error = read_time_value(met, time_value);
temp_op_info->set_met(time_value, temp_op_info->met_unit());
                                                                                                                                                                     op_mrt_error = read_time_value(mrt, time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   op_mcp_error = read_time_value(mcp, time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if ((temp_op_info->met() != UNDEFINED_TIME) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_op_info->met_unit(MS);
if (temp_op_info->period() == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_op_info->set_default_met_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   static void display_timing(int timing_type) {
                                               if (!temp_op_info->is_terminator()) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               char *prompt, buffer[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *required_by_str = "Required By";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // Use default MS if UNDEFINED_TIME
                                                                                                                                                                                                                                                                                                                                                              temp_op_info->mrt(time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_op_info->mcp(time_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info~>period_unit(HS);
if (temp_op_info~>fw() == UNI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_op_info->fw_unit(MS);
                                                                                                                                                                   if (op_met_error) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (temp_op_info->met()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              reset_met_location)
                                                                                                                                                                                                                                                                                                                                                                                                            if (op_mrt_error) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (op_mcp_error) {
  case SPORADIC:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  break;
```

```
mcp_label = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             req_by_label(mrt_req_by, *(temp_op_info->mrt_req_by_adr()));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         req_by_cb, (XtPointer) temp_op_info->mrt_req_by_adr());
                                                   mmrt_unit = time_unit_menu(op_dialog, "unit_box",
temp_op_info->mrt_unit(), mrt_unit_cb,
TAB_UNIT,RGW10);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          mcp_unit = time_unit_menu(op_dialog, "unit_box",
                                                                                                                                                       mrt_unit_label = XmOptionLabelGadget(mrt_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   mcp_unit_label = XmOptionLabelGadget(mcp_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(mrt_req_by, XmNactivateCallback,
                                                                                                                                                                                                                                                                  = XtVaCreateManagedWidget(required_by_str,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op_info->mcp_unit(), mcp_unit_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        mcp = XtVaCreateManagedWidget("mcp",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                             xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtUnmanageChild(mrt_unit);
XtUnmanageChild(mrt_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Not needed yet...
XtUnmanageChild(mrt_label);
XtUnmanageChild(mrt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   prompt = dup_str("MCP:");
                                                                                                                                                                                                               // requirements....
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // requirements....
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNx, TAB_VALUE,
XmNy, ROW9,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KmNcolumns, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                TAB_UNIT, ROW9);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(prompt);
                                                                                                                                                                                                                                                                                                                      KmNx, TAB_REQMT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNy, ROW9,
                                                                                                                                                                                                                                            mrt_req_by
                                                                                                                                                                                                                                                                                                                                                   KmNy, ROW10+3,
                                                                                                                                                                                                                                                                                                                                                                            KmNwidth, 120,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (!mcp) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NULL);
                                                                                                                                                                                                                                                                                                                                                                                                         NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                req_by_label(period_req_by, *(temp_op_info->period_req_by_adr()));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 mrt_label = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             req_by_cb, (XtPointer) temp_op_info->period_req_by_adr());
                                                                                                                                                                                                                                                                                                                                                                                                      period_unit_label = XmOptionLabelGadget(period_unit);
                                                                                                                                                                                                                                                                                        period_unit = time_unit_menu(op_dialog, "unit_box",
temp_op_info->period_unit(), period_unit_cb,
TAB_UNIT,ROW9);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtAddCallback(period_req_by, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = XtVaCreateManagedWidget(required_by_str, xmPushButtonGadgetClass, op_dialog,
                                                                                                    period = XtVaCreateManagedWidget("period",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              mrt = XtVaCreateManagedWidget("mrt",
                          KmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                               xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtManageChild(period);
XtManageChild(period_unit);
XtManageChild(period_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtManageChild(period_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         prompt = dup_str("MRT:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                       // requirements....
                                                                                                                                                       XmNx, TAB_VALUE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNx, TAB_VALUE,
                                                                                                                                                                                                          XmNcolumns, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KmNcolumns, 10,
                                                                              free(prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       period_req_by
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNx, TAB_REQMT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNy, ROW10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KmNy, ROW10,
                                                                                                                                                                                  XmNy, ROW9,
KmNy, ROW9,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KmNwidth, 120,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (!mrt) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNy, ROW9+3,
                                                                                                                                                                                                                                   NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NULL);
```

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req_by_label(met_req_by, *(temp_op_info->met_req_by_adr()));
XtVaSetValues(period, XmNvalue, "", NULL);
req_by_label(period_req_by, NULL);
XtVaSetValues(fw, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                           req_by_label(fw_req_by,*(temp_op_info->fw_req_by_adr()));
                                                                                                                                                                                                                                                  req_by_cb, (XtPointer) temp_op_info->fw_req_by_adr());
                                                                                                                                                                                                                                                                                                                                                                                                XtManageChild(fw_label); XtManageChild(fw_label2);
                                                                                                                                                                                                                        XtAddCallback(fw_req_by, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 sprintf(buffer, "%d", temp_op_info->met());
XtVaSetValues(met, XmNvalue, buffer, NULL);
               = XtVaCreateManagedWidget(required_by_str,
xmPushButtonGadgetClass, op_dialog,
XmNx, TAB_REQWI,
XmNy, RGW10+3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // None - all inactive
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(met, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_op_info->period_reqmts_dup(NULL);
temp_op_info->fw(UNDEFINED_TIME);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (!temp_op_info->is_terminator()) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_op_info->period(UNDEFINED_TIME);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_op_info->met_reqmts_dup(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_op_info->met(UNDEFINED_TIHE);
temp_op_info->met_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (temp_op_info->is_terminator()) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           temp_op_info->mcp_reqmts_dup(NULL);
temp_op_info->mrt(UNDEFINED_TIME);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info->mrt_reqmts_dup(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_op_info->fw_reqmts_dup(NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_op_info->mcp(UNDEFINED_TIME);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op_info->period_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op_info->mcp_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op_info->mrt_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_op_info->fw_unit(MS);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtManageChild(fw_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtManageChild(fw_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            switch (timing_type) {
                                                                                                                                                                                                                                                                                                                                                                                                                          XtManageChild(fw);
                                                                                                                                   KmNwidth, 120,
fw_req_by
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           case NTC:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else {
                                                                                                                                                                NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        fw_label2 = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          fw_label = XtVaCreateManagedWidget(prompt, xmLabelGadgetClass,
                                                                                                                                                                                                                                                                                                           req_by_label(mcp_req_by, *(temp_op_info->mcp_req_by_adr()));
                                                                                                                                                                                                                                                  req_by_cb, (XtPointer) temp_op_info->mcp_req_by_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      fw_unit = time_unit_menu(op_dialog, "unit_box",
                                                                                                                                                                                                                      XtAddCallback(mcp_req_by, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                fw_unit_label = XmOptionLabelGadget(fw_unit);
                         = XtVaCreateManagedWidget(required_by_str,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_op_info->fw_unit(), fw_unit_cb,
TAB_UNIT,ROW10);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaCreateManagedWidget("fw",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              op_dialog,
                                                 xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           prompt = dup_str("Within:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtUnmanageChild(mcp_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (!fw) {
   prompt = dup_str("Finish");
                                                                                                                                                                                                                                                                                                                                                                                                                       XtUnmanageChild(mcp_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtUnmanageChild(mcp_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtUnmanageChild(mcp);
                                                                                                                                                                                                                                                                                                                                                                                                // Not needed yet ...
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // requirements....
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KmNx, TAB_LABEL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XMNz, TAB VALUE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNcolumns, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNy, ROW10+15,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free(prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free (prompt);
                                                                        XmNx, TAB_REQMT,
XmNy, ROW9+3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KmNy, ROW10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNy, ROW10,
  mcp_req_by
                                                                                                                                   KmNwidth, 120,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       I AT
                                                                                                                                                                NULL);
```

```
AtVaSetValues(period_unit_label, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(met_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(met_unit_label, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNsensitive, False, NULL);
XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                    XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                    XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                        XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtVaSetValues(mrt_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KtVaSetValues(mcp_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(met_req_by, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues(period_label, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KtVaSetValues(mcp_req_by, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(fw_unit_label, XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(period_req_by,XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(period_unit, XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNsensitive, True,
                                                                                         XtVaSetValues(fw, XmNvalue, buffer, NULL);
                                                               sprintf(buffer, "%d", temp_op_info->fw());
                            if (temp_op_info->fw() != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNsensitive,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNsensitive,
                                                                                                                                                                                        XtVaSetValues(fw, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                     (!temp_op_info->is_terminator()) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KtUnmanageChild(mrt_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (tUnmanageChild(mcp_req_by);
                                                                                                                                                                                                                                                                                                                        XtVaSetValues(met_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KtUnmanageChild(mcp_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtUnmanageChild(mrt_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(met_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KtVaSetValues(mrt_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KtUnmanageChild(mcp_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtUnmanageChild(mrt_unit);
                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(met_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues(met_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(fw_label2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KtVaSetValues(fw_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KtVaSetValues(mcp_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KtVaSetValues (mrt_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KtVaSetValues (mcp_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues(fw_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtVaSetValues (mrt_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KtVaSetValues(fw_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues (period,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KtUnmanageChild(mcp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtVaSetValues(met,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtUnmanageChild(mrt);
                                                                                                                                                                                                                                                                                                                                                    (tVaSetValues(met,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KtVaSetValues (mcp,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues (mrt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues (fw,
                                                                                                                                                            else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtVaSetValues(period_unit, XmNsensitive, False, NULL);
XtVaSetValues(period_unit_label, XmNsensitive, False, NULL);
XtVaSetValues(period_req_by,XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                     XtVaSetValues(met_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues(mrt_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (tVaSetValues(mcp_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(fw_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNsensitive, False, NULL);
                                                                                                                                                                                                                           XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(met_req_by, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                    NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(period_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsensitive, False, MULL);
                                                                                                                                                                                           XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                           XmNsensitive, False, NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Met, Period, Finish Within
                                                                                                                                                                                                                                                                                                                                                                                                                    True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              sprintf(buffer, "%d", temp_op_info->period());
XtVaSetValues(period, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (temp_op_info->period() != UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      sprintf(buffer, "%d", temp_op_info->met());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtVaSetValues(met, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (temp_op_info->met() != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtVaSetValues(period, XmNvalue, "", NULL);
                            XmNvalue, "", NULL);
                                                                                      XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(met_req_by, XmNsensitive,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNsensitive,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNsensitive,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNsensitive,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(met, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                     if (!temp_op_info->is_terminator())
                                                               req_by_label(mcp_req_by, NULL);
                                                                                                                            req_by_label(mrt_req_by, NULL);
ceq_by_label(fw_req_by, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(mrt_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KtVaSetValues (mcp_req_by,
                                                                                                                                                                                      XtVaSetValues(met_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues(fw_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtVaSetValues(fw_label2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues(mrt_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues (mcp_label,
                                                                                                                                                                                                                                                        KtVaSetValues (met_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KtVaSetValues (fw_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(mrt_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (tVaSetValues(mcp_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtVaSetValues (fw_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtVaSetValues (period,
                                                                                               KtVaSetValues(mrt,
                                  (tVaSetValues (mcp,
                                                                                                                                                                                                                           KtVaSetValues(met,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(mrt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KtVaSetValues (mcp,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtVaSetValues(fw,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            case PERIODIC:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               break;
```

NULL);

True,

NULL);

NULL); NULL); NULL);

True,

NULL);

```
static void timing_cb(Widget w, XtPointer which, XtPointer cbs) {
                                                                         XtVaSetValues(period_unit_label, XmNsensitive, False, NULL); XtVaSetValues(period_req_by,XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtUnmanageChild(fw_label2);
                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                  XtVaSetValues(fw_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                          XmNsensitive, True, NULL);
XmNsensitive, True, NULL);
XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                        NULL);
                  XmNsensitive, False, NULL);
                                                                                                                                                                   NULL);
                                                                                                                                                                                                NULL);
                                                                                                                                                                                                                          XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                     NULL);
                                                    XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (tVaSetValues(mcp_unit_label, XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(mrt_unit_label, XmNsensitive, True,
                                                                                                                                                                                                                                                                                    XmNsensitive, False,
ftVaSetValues(period_label, XmNsensitive, False,
                                                                                                                                      XmNsensitive, False,
                                                                                                                                                                   XmNsensitive, False,
                                                                                                                                                                                                XmNsensitive, False,
                                                                                                                                                                                                                                                                                                              XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                        XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                     XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNsensitive, True,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtUnmanageChild(period_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (tUnmanageChild(period_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtUnmanageChild(period_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (tUnmanageChild(fw_req_by);
                            XtVaSetValues(period,
XtVaSetValues(period_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaSetValues(mrt_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtUnmanageChild(fw_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtManageChild(met_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KtVaSetValues(mcp_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (tManageChild(mcp_req_by);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtManageChild(mrt_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (tUnmanageChild(fw_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtManageChild(met_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(mrt_req_by)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (tManageChild(mcp_label);
                                                                                                                                                                                                                                                                                      XtVaSetValues(fw_req_by,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtUnmanageChild(period);
                                                                                                                                                                                                                                                                                                                   XtVaSetValues(mrt_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues (mcp_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtManageChild(met_unit);
                                                                                                                                                                   KtVaSetValues(fw_label2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (tManageChild(mcp_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtManageChild(mrt_unit);
                                                                                                                                        KtVaSetValues(fw_label,
                                                                                                                                                                                                                                                                                                                                                                     XtVaSetValues (mrt_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaSetValues(mcp_unit,
                                                                                                                                                                                                                             XtVaSetValues(fw_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtUnmanageChild(fw);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (tManageChild(met);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtManageChild(mrt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (tManageChild(mcp);
                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(mrt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(mcp,
                                                                                                                                                                                                  KtVaSetValues (fw,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            break;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(met_unit_label, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(met_unit_label, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNsensitive, False, NULL);
XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNsensitive, True, NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(met_req_by, XmNsensitive, True, NULL);
                                                                                                                                                                                                                             XtManageChild(fw_label2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (temp_op_info->met() != UNDEFINED_IIME) {
    sprintf(buffer, "%d", temp_op_info->met());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (temp_op_info->mrt() != UNDEFINED_TIME) {
    sprintf(buffer, "%d", temp_op_info->mrt());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(mrt, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtVaSetValues(met, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   sprintf(buffer, "%d", temp_op_info->mcp());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtVaSetValues(mcp, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (temp_op_info->mcp() != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(met, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtVaSetValues(mcp, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaSetValues(mrt, XmNvalue, "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                               // Met, MRT, MCP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (!temp_op_info->is_terminator()) {
                                                                                                                                                                                             XtManageChild(period_req_by);
                                                                                    XtManageChild(met_req_by);
XtManageChild(period_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KtVaSetValues (met_label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtVaSetValues (met_label,
                                                                                                                                                                   XtManageChild(period_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues(met_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtVaSetValues (met_unit,
     KtManageChild(met_label);
                                                                                                                                                                                                                                                                                                                   XtManageChild(fw_req_by);
                                                                                                                                                                                                                             XtManageChild(fw_label);
                                                       XtManageChild(met_unit);
                                                                                                                                                                                                                                                                                    KtManageChild(fw_unit);
                                                                                                                                      XtManageChild(period);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtVaSetValues(met,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(met,
                            XtManageChild(met);
                                                                                                                                                                                                                                                            XtManageChild(fw);
                                                                                                                                                                                                                                                                                                                                                                                                                               case SPORADIC:
                                                                                                                                                                                                                                                                                                                                                                           break;
```

```
action_items[1].data = (XtPointer)dialog;//Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                   dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pane = XtVaCreateWidget("pane", xmPanedWindouWidgetClass, dialog,
                                                                                                                                   ۲,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        description); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "output_guard.hlp" }
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            string = XmStringCreateSimple("View or Edit Operator "
"Output Guard Equation");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       12); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      70); 11+1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      description = temp_op_info->output_guard_list();
  dialog, pane, rc, text_w, action_a;
                                                                                                        XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pane, NULL);
                                                                                                                                                                                                                                                                                                                                       XmNtitle, "Operator Output Guard",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                  XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtSetArg(args[n], XmNrows,
                                                       *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmStringFree(string);
                                                                                                                                                                                               {"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       rc, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       args[10];
                            XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  n = 0;
                                                                                                                                                                                                                                                                                                                  XtParent(v),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NULL);
                                                         char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   copy_str_eps(text, &output_guard_prefix,38);
AtVaSetValues(output_guard_value, XmNvalue, output_guard_prefix, NULL);
free(output_guard_prefix); output_guard_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (!output_guard_value) {
    output_guard_value = XtVaCreateManagedWidget("output_guard_value",
    zmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                static void output_guard_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                              XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      static void output_guard_cb(Widget w, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtDestroyWidget(XtParent(XtParent(XtParent(v)));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNeditable, False,
                                                                              temp_op_info->timing_type( (int) which );
                                                                                                                                   display_timing(temp_op_info->timing_type());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if ((text != NULL) && (*text != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtDestroyWidget(output_guard_value);
output_guard_value = NULL;
(XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_op_info->output_guard_list(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                      char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                                                                                                                                    Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNshadovThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            text
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (output_guard_value) {
                                                                                                                                                                                                                                                                                                           XtPointer call_data) {
                                                 if (state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNx, TAB3,
XmNy, ROW11,
                                                                                                                                                                                               return;
```

```
action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtManageChild(text_u);
//text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                    ۲,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                description); n++;
    static void trigger_if_cond_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              string = XmStringCreateSimple("View or Edit Operator Trigger
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            "trigger_if_cond.hlp"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            12); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  70); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            description = temp_op_info->trigger_if_condition();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    "If Condition");
                                                                                                                                                              dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                          {"UK", trigger_if_cond_ok_pushed, NULL {"Cancel", close_dialog, NULL
                                                                                                                                                                                                                                                                                                                                                                              action_items[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNtitle, "Operator Trigger If Condition",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n], XmNrows,
                                                      XtPointer call_data) {
                                                                                                                                                                                                                                                                           *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                   static ActionArealtem
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 f"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      rc, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                args [10];
                                                                                                                                                                                                                    XmString string
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    n = 0:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtParent(w),
                                                                                                                                                                                                                                                                           char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int
                                                                                                                                                                   action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   )

Manage of the structure of the struct
                                                                                                                                                                                                                                                                 //XthdddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           static void trigger_if_cond_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (!trigger_if_value) {
    trigger_if_value = XtVaCreateManagedWidget("trigger_if_value",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
//Set client data for the "UK" and "Cancel" buttons action_items[0].data = (XtPointer)text_u;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_op_info->trigger_if_condition(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if ((text != NULL) && (*text != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtDestroyWidget(trigger_if_value);
trigger_if_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    text
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (trigger_if_value) {
                                                                                                                                                                                                                                                                                                                                                                                   XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                         free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNwidth, 170,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KmNx, TAB5,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNy, ROW5,
```

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action_items[1].data = (XtPointer)dialog;//Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      string = XmStringCreateSimple("View or Edit Operator Exceptions");
XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        description); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                               "exceptions_list.hlp"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        true); n++;
true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (tSetArg(args[n], XmNcursorPositionVisible, true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             true); n++;
                                                                                                                                  static void exception_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               70); n++;
XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          description = temp_op_info->exception_list();
                                                                                                                                                                                                                  dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                         XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNtitle, "Operator Exceptions",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (tSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (tSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtSetArg(args[n], XmNrows,
                                                                                                                                                              XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNlabelString, string,
                                                                                                                                                                                                                                                                          *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                            {"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KtSetArg(args[n],
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[n],
                                                                                                                                                                                                                                              XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     args[10];
                                                  clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            n = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtParent(w),
                                                                                                                                                                                                                  Widget
                                                                                                                                                                                                                                                                          char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int
                                                                                                                                                                                                                  action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                         XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                       //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (!exception_value) {
    exception_value = XtVaCreateManagedWidget("exception_value",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static void exception_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNeditable, False,
                                                                                                                                                           action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if ((text != NULL) && (*text != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtDestroyWidget(exception_value);
exception_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_op_info->exception_list(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           text
                                                                                                                                                                                                                                                                                                                                                                              XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (exception_value) {
                                                                                                                                                                                                                                                                                                                              XtManageChild(pane);
                                                                             XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                          free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNy, ROW12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNr, TAB3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ij
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action_items[1].data = (XtPointer)dialog;//Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         true); n++;
XmMULTI_LINE_EDIT); n++;
true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ·,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          pane, NULL);
string = XmStringCreateSimple("View or Edit Operator Timers");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaCreateManagedWidget("label", xmLabelCadgetClass, rc, XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                true); n++;
                                                                                                                                                                                                                                                                          static void timer_op_cb(Widget w, AtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (2); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              70); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      "timer_list.hlp"
                                                                                                                        XtDestroyWidget(XtParent(XtParent(XtParent(w)));
                                                                                                                                                                                                                                                                                                                                                                            dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               description = temp_op_info->timer_op_list();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static ActionAreaItem action_items[] = {
                                                          = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtSetArg(args[n], XmNscrollVertical,
XtSetArg(args[n], XmNscrollHorizontal,
XtSetArg(args[n], XmNeditMode,
XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           {"UK", timer_op_ok_pushed, NULL
{"Cancel", close_dialog, NUL
                                                             text
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNdeleteResponse, XmDESTROY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNtitle, "Operator Timers",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                       *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      {"Help", help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      args[10];
                                                                                                                                                                                                                                                                                                                                                                                                           XmString string
                                                                                                                                                                                   clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          n = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           KmNsashWidth,
                                                             free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtParent(w),
                                                                                                                                                                                                                                                                                                                                                                                                                                       char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NULL);
                            //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                                        action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                     XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(timer_op_value, XmNvalue, timer_op_prefix, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (!timer_op_value) {
   timer_op_value = XtVaCreateManagedWidget("timer_op_value",
   xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             static void timer_op_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                              //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 timer_op_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           copy_str_eps(text, &timer_op_prefix,38);
                                                                                                                                                                                                                                                                          action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if ((text != NULL) && (*text != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char *text = XmTextGetString(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Widget text_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (timer_op_value) {
   XtDestroyWidget(timer_op_value);
   timer_op_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_op_info->timer_op_list(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(timer_op_prefix);
XtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtManageChild(pane);
                                                     rc, NULL);
                                                                                                                                                                                   XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNx, TAB3,
XmNy, ROW13,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL);
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static void operator_cancel_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Operator Object *op_being_updated,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 static void operator_help_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int x, int y, BUGLEAN parent_terminator, ID_LIST avail_impl_langs,
                                                                                                                                                                                                                                                                    XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Global_avail_impl_langs = avail_impl_langs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void operator_property_dialog(Widget parent,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     char *prompt, buffer[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GraphObjectList *graphic_list) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     help_cb(w, client_data, call_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                opDialogGraphicList = graphic_list;
op_being_updated->set_modified();
save_state(SAVE_REQUIRED);
                                                                                                                                                                                                                                                                                                                                                                                          // Recover any allocated memory
                                                                                                                                                                                                                                                                                                                             XtDestroyWidget(XtParent(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   timer_op_walue = NULL;
if_condition_prefix = NULL;
output_guard_prefix = NULL;
exception_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         output_guard_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                        delete temp_op_info;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             exception_prefix
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       exception_value
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           timer_op_prefix
                                                            clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Arg args[10];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmString tmp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ac:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                              //text_w = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                        XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                            description); n++;
                                                                                  text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static void operator_ok_cb(Widget w, XtPointer client_data, XtPointer call_data) {
KtSetArg(args[n], XmNcursorPositionVisible, true); n++;
                              true); n++;
                                                                                                                                                                                                                                                                                                                                                         //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   OperatorUbject *op_being_updated;
op_being_updated = (OperatorUbject *) client_data;
                                                                                                                                                                                                                                                                                                                                                                                    action_items[0].data = (XtPointer)text_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *op_being_updated = *temp_op_info;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   op_being_updated->unselect();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      op_being_updated->select();
                        XtSetArg(args[n], XmNwordWrap,
XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Recover any allocated memory
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       op_being_updated->draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtDestroyWidget(XtParent(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (op_met_error) return;
if (op_fetror) return;
if (op_feterror) return;
if (op_mcp_error) return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    op_being_updated->erase();
                                                                                                                   XtManageChild(text_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Check for any errors
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       delete temp_op_info;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (op_name_error)
                                                                                                                                                                         rc, NULL);
                                                                                                                                                                                                                                                                                                  XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (op_mrt_error)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             >
```

```
oper_label = XmVaCreateSimpleOptionMenu(op_dialog, "oper_label",
                                                                                                                                                                                                                                                                                                                                                                                                             /******************** Implementation ************/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (tVaCreateManagedWidget(prompt, xmLabelGadgetClass, op_dialog,
                                                                                                  NULL, NULL, temp_op_info->is_terminator(), operator_cb, XmVaPUSHBUTTON, oper_string, NULL, NULL, NULL, XmVaPUSHBUTTON, term_string, NULL, NULL,
oper_string = XmStringCreateSimple("Operator");
term_string = XmStringCreateSimple("Terminator");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KtVaSetValues(oper_name, XmNvalue, name_str, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              pper_name = XtVaCreateManagedWidget("oper_name",
xmTextFieldWidgetClass, op_dialog,
XmNx, TAB_VALUE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 prompt = dup_str("Implementation:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     name_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    name_str = temp_op_info->name();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      prompt = dup_str("Name:");
XtVaCreateManagedWidget(prompt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         mmLabelGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                               XmStringFree(term_string);
XmStringFree(oper_string);
XtManageChild(oper_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 langCount, n, i;
                                                                                                                                                                             XmNx, TAB6,
XmNy, ROW2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (mString langStr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (D_LIST langPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free(name_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 char *name_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free (prompt);
                                                                                                                                                                                                                                NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         free(prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KmNy, ROW2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (mNx, TAB2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KmNx, TAB2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KmNy, ROW3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                            prompt = dup_str("Bad Operator Pointer Passed To Operator Dialog");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           op_dialog = XmCreateBulletinBoardDialog(GetTopShell(parent),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // Get data from selected operator and store locally
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtSetArg(args[ac], XmNheight, WIN_HEIGHT);
XtSetArg(args[ac], XmNwidth, WIN_WIDTH);
XtSetArg(args[ac], XmNautoUnmanage, False);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                tmp = XmStringCreateSimple("Operator Property");
                                                                                                                                                                                                                                                                                                                                                                                                                                    if (op_being_updated == (OperatorObject *)NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 tmp = XmStringCreateSimple("Terminator");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtSetArg(args[ac], XmNdialogTitle, tmp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmString oper_string, term_string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNalignment, XmaLIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                   temp_op_info = new OperatorObject();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               *temp_op_info = *op_being_updated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       "Operator_Property", args, ac);
                                                                                               = false;
= false;
= false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   warning(parent, prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (parent_terminator) {
                                                                             = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    } else { // Build dialog
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNlabelType, XmSTRING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNlabelString, tmp,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmStringFree(tmp);
  // reset error status
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringFree(tmp);
                            clear_status();
                                                                                                    op_period_error
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free(prompt);
                                                                                                                                                                                                                                                       period = NULL;
                                                                                                                                                                                                                                                                                   = NULL;
                                                                                                                                                                                                                                = NULL;
                                                        op_name_error
                                                                             op_met_error
                                                                                                                              op_mrt_error
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KmNy, ROW2,
                                                                                                                                                     op_mcp_error
                                                                                                                                                                                 op_fw_error
```

```
trigger_label(trigger_list, *(temp_op_info->trigger_set_adr()));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (op_being_updated->trigger_type() != UNPROTECTED) {
   trigger_list = XtVaCreateManagedWidget(dup_str("Stream List"),
xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                  NULL, NULL, op_being_updated->trigger_type(), trigger_cb, XmVaPUSHBUTION, unprotected, NULL, NULL,
                                                                                                                                                                                                                                                                                                                  trigger = XmVaCreateSimpleOptionMenu(op_dialog, "trigger",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = XtVaCreateManagedWidget(dup_str("If Condition"),
                                                                                                                                                                                      unprotected = XmStringCreateSimple("unprotected");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtAddCallback(trigger_if_cond, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtAddCallback(trigger_list, XmNactivateCallback,
                                                                                                                                                                                                                   = XmStringCreateSimple("By Some");
= XmStringCreateSimple("By All");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (XtPointer) temp_op_info->trigger_set_adr());
                                                                                                                            XmString by_some, by_all, unprotected;
  XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              trigger_if_cond_cb, (XtPointer)NULL);
                                                               prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                            XmVaPUSHBUTTON, by_some,
                                                                                                                                                                                                                                                                                                                                                                                                                                              XmVaPUSHBUTTON, by_all,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmStringFree(unprotected);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNx, TAB_VALUE-10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char* if_cond_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmStringFree(by_some);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                trigger_list = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmStringFree(by_all);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNy, ROW4,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          trigger_list_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // if condition
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            trigger_if_cond
                                                               free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmNx, TAB_VALUE,
XmNy, ROW5,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNwidth, 100,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNwidth, 170,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNx, TAB5,
XmNy, ROW4+3,
                                                                                                                                                                                                                        by_some
                                                                                                                                                                                                                                                        by_all
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (impl_lang_options+n)->widget_class = &xmPushButtonGadgetClass;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *temp_op_info->operator_impl_lang_adr()) == 0) ? true : false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaCreateManagedWidget(prompt, xmLabelGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (impl_lang_options+n)->label = NULL; // terminate list
                                                                                                                                                                                                                                                                                  impl_lang_options = (MenuItem *) malloc((langCount+1) *
                                                                                                                                                                                                                                                                                                                     sizeof (MenuItem));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (impl_lang_options+n)->callback = impl_lang_cb;
(impl_lang_options+n)->callback_data = (XtPointer) n;
(impl_lang_options+n)->subitems = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = langPtr->id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (XtPointer) temp_op_info->operator_impl_lang_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    impl_lang = BuildMenu(op_dialog, XmMENU_OPTION,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(impl_lang, XmNx, TAB2-3, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(impl_lang, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(impl_lang, XmNy, ROW3, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (impl_lang_options+n)->act_display
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (impl_lang_options+n)->accelerator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (impl_lang_options+n)->accel_text
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (impl_lang_options+n)->sensitive
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (impl_lang_options+n)->mnemonic
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (impl_lang_options+n)->subitems
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free((char*) impl_lang_options);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (impl_lang_options+n)->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            prompt = dup_str("Trigger:");
MenuItem *impl_lang_options;
                                                            langPtr = avail_impl_langs;
                                                                                                                                                                                                                                                                                                                                                                                                            langPtr = avail_impl_langs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             langPtr = langPtr->next;
                                                                                                                                                                                         langPtr = langPtr->next;
                                                                                                                      while (langPtr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtManageChild(impl_lang);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NULL, impl_lang_options);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                "Implementation Language:
                                                                                                                                                                                                                                                                                                                                                                                                                                              while (langPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (strcmp(langPtr->id,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNx, TAB2,
```

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if ((output_guard_str != NULL) && (*output_guard_str != '\0')) {
   output_guard_value = XtVaCreateManagedWidget("output_guard_value",
xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /****************** output guard **************
                                                                                                                                                         NULL, NULL, op_being_updated->timing_type(), timing_cb, XmVaPUSHBUTION, ntc, NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       output_guard_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             copy_str_eps(output_guard_str,&output_guard_prefix,38);
                                                                                                                            timing = XmVaCreateSimpleOptionMenu(op_dialog, "timing"
ntc = XmStringCreateSimple("Non-Time Critical");
periodic = XmStringCreateSimple("Periodic");
sporadic = XmStringCreateSimple("Sporadic");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = XtVaCreateManagedWidget(dup_str("Output Guards"),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 output_guard_str = temp_op_info->output_guard_list();
                                                                                                                                                                                                                XmVaPUSHBUTION, periodic, NULL, NULL, NULL,
                                                                                                                                                                                                                                                XmVaPUSHBUTTON, sporadic, NULL, NULL, NULL, XmNr, TAB_VALUE-10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           display_timing(op_being_updated->timing_type());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtAddCallback(output_guard, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtVaSetValues(output_guard_value, XmNvalue,
output_guard_prefix, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 output_guard_cb, (XtPointer)NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char* output_guard_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(output_guard_prefix);
                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(sporadic);
                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmStringFree (periodic);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtManageChild(timing);
                                                                                                                                                                                                                                                                                                                     XmNy, ROW7,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmStringFree(ntc);
                                                                                                                                                                                                                                                                                                                                                  NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    output_guard
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNwidth, 100,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNy, ROW11,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmNy, RGW11,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNx, TAB2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KmNx, TAB3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              req_by_label(trigger_req_by, *(temp_op_info->trigger_req_by_adr()));
                                                                                      trigger_if_value = XtVaCreateManagedWidget("trigger_if_value",
xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          <del>/*********************</del>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtVaCreateManagedWidget(prompt, xmLabelGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                  XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtAddCallback(trigger_req_by, XmNactivateCallback,
req_by_cb, (XtPointer) temp_op_info->trigger_req_by_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free(if_condition_prefix); if_condition_prefix = NULL;
                                                            if ((if_cond_str != NULL) && (*if_cond_str != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                  copy_str_eps(if_cond_str,&if_condition_prefix,25);
  if_cond_str = temp_op_info->trigger_if_condition();
                                                                                                                                                                                                                                                     XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if_cond_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(trigger_if_value, XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = XtVaCreateManagedWidget(prompt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                  if_condition_prefix, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /***************** Timing
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     prompt = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmString ntc, periodic, sporadic;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               prompt = dup_str("Required By");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtManageChild(trigger_req_by);
                                                                                                                                                                                                                                                                                                                  XmNshadowThickness, 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    prompt = dup_str("Timing:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           trigger_if_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtManageChild(trigger);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(if_cond_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // requirements...
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 trigger_req_by
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XMNx, TAB_VALUE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KmNx, TAB2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNwidth, 120,
                                                                                                                                                                                                                      XmNwidth, 170,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KmNy, ROW7
                                                                                                                                                         XmNx, TAB5,
                                                                                                                                                                                         XmNy, ROWS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNv. ROWG,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NULL);
                                                                                                                                                                                                                                                                                                                                                  NULL):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NULL);
```

```
keyword_label(spec_keyword_button, *temp_op_info->key_word_list_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /******************* Spec Buttons ******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ", args, ac);
                                                                                                                                                                     timer_op_value = XtVaCreateManagedWidget("timer_op_value", xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                       XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaCreateManagedWidget("separator", xmSeparatorWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[ac], XmNx, 2*but_spacing+10 + 110); ac++; XtSetArg(args[ac], XmNy, ROW14); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               timer_op_prefix = NULL;
                                                                                                                                      if ((timer_str != NULL) && (*timer_str != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtSetArg(args[ac], XmNr, but_spacing+10); ac++;
XtSetArg(args[ac], XmNy, RUW14); ac++;
XtSetArg(args[ac], XmNwidth, 110);
ac++
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Keywords
                                                                                                                                                                                                                                                                                                                 XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                         copy_str_eps(timer_str,&timer_op_prefix,38);
XtVaSetValues(timer_op_value, XmNvalue,
timer_op_prefix, NULL);
XtAddCallback(timer_op, XmNactivateCallback,
timer_op_cb, (XtPointer)NULL);
                                                                                      timer_str = temp_op_info->timer_op_list();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    but_spacing = (WIN_WIDTH - (3 * 110))/4;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   timer_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtManageChild(spec_keyword_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmCreatePushButton(op_dialog, "
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtSetArg(args[ac], XmNwidth, 110);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  op_dialog,
                                                                                                                                                                                                                                                                                                                                                                   XmNshadowThickness, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(timer_op_prefix);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           timer_op_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            spec_keyword_button =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ROW14 - 8,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNwidth, WIN_WIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(timer_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int but_spacing;
                                                                                                                                                                                                                             XmNx, TAB3,
XmNy, ROW13,
XmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else
                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  exception_value = XtVaCreateManagedWidget("exception_value",
                                                                                                                    XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /**************** timer ops **************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if ((exception_str != NULL) && (*exception_str != '\0')) {
                                                          output_guard_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        exception_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      copy_str_eps(exception_str,&exception_prefix,38);
                                                                                                                                                                                                                                                           = XtVaCreateManagedWidget(dup_str("Exceptions"),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = XtVaCreateManagedWidget(dup_str("Timer Ops"),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         exception_str = temp_op_info->exception_list();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtAddCallback(exception, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free(exception_str); exception_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtVaSetValues(exception_value, XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              exception_prefix, NULL);
                                                                                                                                                                                                                                                                                       xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    xmPushButtonGadgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      xmTextFieldWidgetClass, op_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 exception_cb, (XtPointer)NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNshadowThickness, 1,
                                                                                                                                                                          char* exception_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(exception_prefix);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       exception_value = NULL;
                                                               free(output_guard_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            char* timer_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                 XmNwidth, 100,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNwidth, 250,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNwidth, 100,
                                                                                                                                                                                                                                  exception
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNx, TAB3,
XmNy, ROW12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNx, TAB2,
XmNy, ROW13,
                                                                                                                                                                                                                                                                                                                                               XmNy, ROW12,
                                                                                                                                                                                                                                                                                                                      XmNx, TAB2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NULL);
```

output_guard_value = NULL;

```
XtAddCallback(cancel_button, XmNactivateCallback, operator_cancel_cb,
                                                                                                                                                                                          cancel_button = XmCreatePushButton(op_dialog, " Cancel ", args, ac);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       help_button = XmCreatePushButton(op_dialog, " HELP ", args, ac);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(help_button, XmNactivateCallback, operator_help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtAddCallback(ok_button, XmNactivateCallback, read_timing_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtAddCallback(ok_button, XmNactivateCallback, operator_ok_cb,
                                                                                                                                                                                                                                                                                                                  XtSetArg(args[ac], XmNx, 2*but_spacing+10 + 80); ac++;
                                                               ac++;
                                                                                                BC++3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaSetValues(op_dialog, XmNx, x, XmNy, y, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmProcessTraversal(parent, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtAddCallback(ok_button, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtPopup(GetTopShell(op_dialog), XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      operator_name_cb, (XtPointer)oper_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (XtPointer) "operator_property.hlp");
                                                                                                                           XtSetArg(args[ac], XmNlabelString,
                                                                                             XtSetArg(args[ac], XmNwidth, 80);
                                                                                                                                                         XmStringCreateSimple("Cancel"));
                                                            XtSetArg(args[ac], XmNy, ROW15);
                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmStringCreateSimple("Cancel"))
                                                                                                                                                                                                                              XtManageChild(cancel_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (XtPointer) op_being_updated);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XtPointer) op_being_updated);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KtManageChild(help_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(op_dialog);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XtPointer) op_dialog);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // 20, 125, 230
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtVaCreatsManagedWidget("separator", xmSeparatorWidgetClass, op_dialog, XmNy, ROW15 - 8,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ", args, ac);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /****************** Action Buttons **********
                              XmCreatePushButton(op_dialog, "Informal Desc ", args, ac);
                                                                                                                                                                                                                                                                                                                                                               ", args, ac);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtAddCallback(spec_informal_button, XmNactivateCallback,
                                                                                                                                                                                                                           XtSetArg(args[ac], XmNx, 3*but_spacing+10 + 220); ac++;
XtSetArg(args[ac], XmNy, ROW14); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtAddCallback(spec_keyword_button, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XtPointer) temp_op_info->operator_informal_desc_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtAddCallback(spec_formal_button, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (XtPointer) temp_op_info->operator_formal_desc_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             but_spacing+10); ac++; ROW15); ac++;
                                                                                                                                                                                                                                                                                                   ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ă
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ac++;
                                                                                                                                                                                                                                                                                                                                                            XmCreatePushButton(op_dialog, " Formal Desc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (XtPointer) temp_op_info->key_word_list_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ok_button = XmCreatePushButton(op_dialog, "
                                                                                                                              temp_op_info->operator_informal_desc_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_op_info->operator_formal_desc_adr());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             but_spacing = (WIN_WIDTH - (3 * 80))/4;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // create the UK, Cancel, Help buttons
                                                               XtManageChild(spec_informal_button);
                                                                                                informal_label(spec_informal_button,
                                                                                                                                                                                                                                                                                             XtSetArg(args[ac], XmNwidth, 110);
                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(spec_formal_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[ac], XmNwidth, 80);
XtSetArg(args[ac], XmNlabelString,
                                                                                                                                                                                                                                                                                                                                                                                                                           formal_label(spec_formal_button,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringCreateSimple("OK"));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtManageChild(ok_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtSetArg(args[ac], XmNx,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtSetArg(args[ac], XmNy,
spec_informal_button =
                                                                                                                                                                                                                                                                                                                                    spec_formal_button =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNwidth, WIN_WIDTH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           informal_desc_cb
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            formal_desc_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NULL);
```

```
Event handler to "post" popup dynamic menus if the button is
the right mouse button, i.e. third button.
                                                                                                                                                                                                                              #ifdef __cplusplus
} /* Close scope of 'extern "C"' declaration which encloses file. */
#endif
                                                                                                                                       * Function: PostDynamicPopUp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #endif /* ifndef POSTPOUP_H */
                                                                                                                                                                                                                                                                                                                                                                                                         Widget w.
XtPointer client_data,
XEvent *event,
Boolean *not_used);
                                                                                                       XtPointer client_data,
XEvent *event,
Boolean *not_used);
                                                                  #endif /* _NO_PROTO */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #endif /* _NO_PROTO */
                                                                                                                                                                                                                                                                                extern void
PostDynamicPopUp();
                                                                                                                                                                                                                                                                                                                                                                                         PostDynamicPopUp(
                                                                                                                                                                                                                                             #ifdef _NO_PROTO
                                                                                                                                                                           * Description:
                                                                                                                                                                                                                                                                                                                                                                      extern void
                                                                                                                                                                                                                                                                                                                                     #e1se
                                                                                                                       Event handler to "post" popup menus if the button is
the right mouse button, i.e. third button.
                                                                                  * Header for functions used to post popup menus.
                                                                                                                                                                                                        #include <X11/cursorfont.h>
#include <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                    Function: PostPopUp
                                 File: postpopup.h
#ifdef __cplusplus
extern "C" {
#endif
                                                                                                                                                    #ifndef POSTPOUP_H
#define POSTPOUP_H
                                                                  Description:
                                                                                                                                                                                                                                                                                                                                                                                                        Description:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifdef _NO_PROTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             extern void
PostPopUp();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PostPopUp(
Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #0150
```

```
Event handler to "post" popup dynamic menus if the button is
the right mouse button, i.e. third button.
            XmMenuPosition(Menu, (XButtonPressedEvent *)event);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Widget (*rebuild)() = (Widget (*)())client_data;
                                                                                                                                                                                                                                                                                                                                                                                                  PostDynamicPopUp(w, client_data, event, not_used)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          setcursor(GetTopShell(w), True, XC_watch);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if (event->xbutton.button == Button3) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   setcursor(GetTopShell(w), False, None);
                                                                                                                                                                                                         PostDynamicPopUp
                                                                                                                                                                                                                                                                                                                                                                                                                     Widget w;
KtPointer client_data;
KEvent *event;
Boolean *not_used;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget w,
XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Menu = (*rebuild)();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtManageChild(Menu);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Boolean *not_used)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #endif /* _NO_PROTO */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *event,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PostDynamicPopUp(
                                                                                                                                                                                                                                                                                                                                             #ifdef _NO_PROTO
                                                                                                                                                                                                                                              * Description:
                                                                                                                                                                                                         * Function:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget Menu;
                                                                                                             return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XEvent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #6156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void
                                                                                                                             /* azzzzzzzz
                                                                                                                                                                    $Source: /home/anunciad/src/master/graphics_editor/postpopup.c,v $
                                                                                                                                                                                                                                                                                                                                                                                                                                                           Event handler to "post" popup menus if the button is
the right mouse button, i.e. third button.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PostPopUp(w, client_data, event, not_used)
                                                                                        * Functions used to post popup menus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget Menu = (Widget)client_data;
                                                                                                                                                                                                       $Date: 1996/08/21 14:20:53 $
                                                                                                                                                                                                                                                #include <X11/cursorfont.h>
                                                                                                                                                                                                                                                                 #include <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                                                                                       PostPopUp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPointer client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtPointer client_data,
                                                                                                                                                                                                                                                                                                      #include "gettopshell.h" #include "setcursor.h"
                                                                                                                                                                                       $Author: anunciad $
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *not_used)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *not_used;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #endif /* _NO_PROTO */
                                   File: postpopup.c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *event;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         *event,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     #ifdef __cplusplus
extern "C" {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Mifdef _NO_PROTO
                                                                          Description:
                                                                                                                                                                                                                                                                                                                                                                                                                                           Description:
                                                                                                                                                                                                                                                                                                                                                                                                      Function:
Boolean
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Boolean
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PostPopUp(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XEvent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XEvent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            tendif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          telse
```

return; }; #ifdef __cplusplus

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void report_errors(ERROR_MSGS errors_present, Widget widget, ACTION next_action_ptr, BOOLEAN *return_sde_flag,

#ifndef REPORT_ERRORS_H #define REPORT_ERRORS_H 1

```
next_action_ptr->next_op = dup_str(errPtr->parent_op_label);
next_action_ptr->next_op_num = errPtr->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    warning(parent_w, "Please select an error message frist");
                                                                                                                                                                                                                                                                                                                                                                           if (XmListGetSelectedPos(list, &selected_error, &count)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           static void errs_current_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = dup_str(errPtr->msg);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /* kbm 97/02/26 */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /* kbm 97/02/26 */
                                                                                                                                                                                                 Rep_Err_Data_Ptr wd = (Rep_Err_Data_Ptr) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = CHECK_SYNTAX;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = true;
                                                                                                                                                                                                                                                                next_action_ptr = wd->next_action_ptr;
return_sde_flag = wd->return_sde_flag;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = true;
                                                                                                                                                                                                                    = wd->prev_status;
                                                                ERROR_MSGS errPtr, errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ERROR_MSGS errPtr, errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                                                            XtFree((char*) selected_error);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtDestroyWidget(wd->parent_w);
                                                                                                                                                                                                                                                                                                                                   = wd->parent_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *return_sde_flag
free((char*) *prev_status);
                                                                                                             *return_sde_flag;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                next_action_ptr;
*return_sde_flag;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           next_action_ptr->reinvoke
                                                                                      next_action_ptr;
                      int *selected_error, count;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                int *selected_error, count;
                                                                                                                                 list, parent_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  errPtr = errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          errPtr = errPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                                                                        i = selected_error[0];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                                                                                         char **prev_status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *prev_status
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      while (---i)
                                                                                                                                                                                                                                                                                                               prev_status
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free(wd);
                                                                                                                                                                                                                                                                                                                                     parent_w
                                                                                                           BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN
                                                                                      ACTION
                                                                                                                                 Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ACTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     static void errs_parent_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    static void errs_close_cb(Widget w, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Rep_Err_Data_Ptr wd = (Rep_Err_Data_Ptr) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                typedef struct rep_err_widget_data {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        } Rep_Err_Data, *Rep_Err_Data_Ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtDestroyWidget(wd->parent_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   next_action_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         *return_sde_flag;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ERROR_MSGS errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     **prev_status;
                                                                                                                                                                                                                                                                                                             #include <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                 #include <Xm/ScrolledW.h>
                                                                                                                                                                                                                                                                                                                                                     <Xm/SelectioB.h>
                                                                                                                                                                                                                                                                                                                                                                           <Xm/Separator.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #include "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #include "graph_editor.h"
#include "warning.h"
                                                                                                         <Xm/DrawingA.h>
                                                                                                                                                                                                                                          #include <Xm/MessageB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                            <Xm/ToggleBG.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #include "action_area.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               parent_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #define OP_LABEL_LEN 15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    widget; .
                                                                                                                               <Xm/DrawnB.h>
                                                                                  #include <X11/Xatom.h>
                                                                                                                                                                         #include <Xm/LabelG.h>
                                                                                                                                                                                                                                                                                      #include <Xm/PushBG.h>
                                                                                                                                                                                                                      <Xm/MainW.h>
                                                                                                                                                                                                                                                                #include <Xm/PushB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                      <Xm/TextF.h>
                                                                                                                                                     <Xm/Form.h>
                                                                                                                                                                                               #include <Xm/List.h>
                                                                                                                                                                                                                                                                                                                                                                                                 <Xm/Text.h>
#include <malloc.h>
                    #include <memory.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                #include <Xm/Xm.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                free(wd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BOOLEAN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Widget
                                                                                                         #include
                                                                                                                               #include
                                                                                                                                                     #include
                                                                                                                                                                                                                      #include
                                                                                                                                                                                                                                                                                                                                                     #include
                                                                                                                                                                                                                                                                                                                                                                         #include
                                                                                                                                                                                                                                                                                                                                                                                               #include
                                                                                                                                                                                                                                                                                                                                                                                                                      #include
                                                                                                                                                                                                                                                                                                                                                                                                                                            #include
```

XtPointer call_data) {

#include <stdlib.h>

```
// Now build an array of pointers to the error messages (XmStrings)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            dialog = XtVaCreatePopupShell("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         errPtr = errPtr->next; // Now process next error message
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Now add current.op_label
strLen = strlen(exrPtr->cur_op_label);
memcpy((errStrBuf+UP_LABEL_LEN+1), errPtr->cur_op_label,
(OP_LABEL_LEN < strLen) ? OP_LABEL_LEN : strLen);</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        str = (XmString *) XtMalloc (count * sizeof (XmString));
                                                                                                                                                                                                                                                                                                                                                                      while (errPtr) { // Count the number of errors present
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   for (i = 0; i < count; i++) {
    errStrLen = 2*OP_LABEL_LEN + strlen(errPtr->msg) + 3;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                memcpy(errStrBuf, errPtr->parent_op_label,
(OP_LABEL_LEN < strLen); OP_LABEL_LEN : strLen);</pre>
                                                          dialog, rc, pane, list, action_a;
count = 0, i, j, n=0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   for (j = 0; j < (2*OP_LABEL_LEN + 2); j++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        strLen = strlen(errPtr->parent_op_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 str[i] = XmStringCreateSimple(errStrBuf);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              errStrBuf = (char *) malloc(errStrLen);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *(errStrBuf+2*OP_LABEL_LEN+2) = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNdeleteResponse, XmDESTROY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Finish off with the error message
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNtitle, "Error Messages",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            strcat(errStrBuf, errPtr->msg);
                                                                                                                                                                                                                               errStrLen, strLen;
                                                                                                                                                                                                                                                                                    // Build up list of errors
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // Clear area for labels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *(errStrBuf+j) = ' ';
                                                                                                                                                                    *str, string;
                                                                                                                                                                                                                                                                                                                       errPtr = errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   errPtr = errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                    errPtr = errPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // Add parent_op_label
                                                                                                                                                                                                  *errStrBuf;
                                                                                                                                          args[5];
                                                                                                                  errPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               free(errStrBuf);
                                                                                                               ERROR_MSGS
                                                                                                                                                                                                                                                                                                                                                                                                            count++;
                                                                                                                                            Arg
XmString
                                                          Widget
                                                                                                                                                                                                    char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(errPtr->cur_op_label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     warning(parent_w, "Please select an error message frist");
                                                                                                                                                                                                                                                                                                            if (XmListGetSelectedPos(list, &selected_error, &count)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void report_errors(ERROR_MSGS errors_present, Widget widget,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /* kbm 97/02/26 */
/* kbm 97/02/26 */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = dup_str(errPtr->msg);
                                                                               Rep_Err_Data_Ptr wd = (Rep_Err_Data_Ptr) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              next_action_ptr->next_op_num = errPtr->cur_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ACTION next_action_ptr, BOOLEAN *return_sde_flag,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           "error.hlp"}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = CHECK_SYNTAX;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    {"Close", errs_close_cb, NULL},
{"Goto Parent", errs_parent_cb, NULL},
{"Goto Current", errs_current_cb, NULL},
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            static ActionArealtem action_items[] = {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = true;
                                                                                                                                                                  next_action_ptr = wd->next_action_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = true;
                                                                                                                                                                                                  return_sde_flag = wd->return_sde_flag;
                                                                                                                                       errors_present = vd->errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (errors_present == NULL) {
    warning( widget, "No PSDL errors");
                                                                                                                                                                                                                            = wd->prev_status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(next_action_ptr->next_op);
                                                                                                                                                                                                                                                                                                                                                                                                    XtFree((char*)selected_error);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtDestroyWidget(wd->parent_w);
                                                                                                                                                                                                                                                       = wd->parent_w;
                                                                                                          = wd->widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     free((char*) *prev_status);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           next_action_ptr->reinvoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      next_action_ptr->next_op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   errPtr = errPtr->next;
list, parent_w;
                                                                                                                                                                                                                                                                                                                                                                                                                                 errPtr = errors_present;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 next_action_ptr->option
                                                                                                                                                                                                                                                                                                                                                                         = selected_error[0];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* build scroll popup */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char **prev_status) {
                       char **prev_status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *return_sde_flag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *prev_status
                                                                                                                                                                                                                                                                                                                                                                                                                                                         while (--i)
                                                                                                                                                                                                                               prev_status
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(wd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         {"Help",
                                                                                                                                                                                                                                                         parent_w
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return;
```

```
// Make a client_data structure
Rep_Err_Data_Ptr vd = (Rep_Err_Data_Ptr) malloc(sizeof(Rep_Err_Data));
                                                                                                                                                                                                                                                                                                                             // Close
// Goto Parent
// Goto Current
                                                                                                                                                                                                                                                                                                                                                                                                                                             wd->return_sde_flag = return_sde_flag;
wd->parent_w = (Widget) dialog;
                                                                                                                                                                                                                                                                                                                             action_items[0].data = (XtPointer)wd;
action_items[1].data = (XtPointer)wd;
action_items[2].data = (XtPointer)wd;
action_items[3].data = (XtPointer)wd;
                                                                                                                                                                                                                                                                   = prev_status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtManageChild(pane);
XtPopup(dialog, XtGrabNone);
XmStringFree(str[i]);
                                                            XtManageChild(rc);
                                                                                                                                                                                                                                                                                                           //Set client data
                                                                                                                                                                                                                                                                   wd->prev_status
                                        rc = XtVaCreateWidget("control_area", xmRowColumnWidgetClass,
                                                                                                                                                                                                                                                                                                                               ".
Exror Message");
XtVaCreateManagedWidget("label_2", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                             Current"
                                                                                                                                                                                          string = XmStringCreateSimple("Select Error Message");
XtVaCreateManagedWidget("label", xmLabelGadgetClass, rc,
XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 list = XmCreateScrolledList(rc, "PSDL Errors", NULL, 0);
                                                                                                                                                                                                                                                                                                         string = XmStringCreateSimple("Parent
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           10,
count,
                                                                                                                                                                            pane, NULL);
                                                                                                                                                                                                                                                                                                                                                                        XmNlabelString, string,
                                                                                     XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNvisibleItemCount,
                                                                                                                                                                                                                                                                                       XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                        XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmNitemCount,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(list,
                                                                                                           NULL);
                                                                                                                                                                                                                                                                   NULL);
                                                                                                                                                                                                                                                                                                                                                                                                  NULL);
```

350

for (i = 0; i < count; i++) {

XtManageChild(list);

XmNitems,

**** */	每年申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申申
Name:	resources.h
Author:	Capt Robert M. Dixon
Program:	
Date Modified:	dified: 21 Sep 92
Remarks:	Establishes common defines
	colors and fonts used in the graph_editor.
*****	一种 计计算操作程序操作系统 计多数 医克格特氏 计多数 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏 医克格特氏病 计记录器 计记录器 计记录器 计记录器 计记录器 计记录器 计记录器 计记录器
#ifndef	RESOURCES_H
#define	
#define	MAXCOLORS 64
#define	AQUAMARINE
#define	BLACK 2
#define	BLUE 3
#define	BLUEVIOLET 4
#define	BROWN 6
#define	CADETBLUE 6
#define	
#define	CORNFLOWERBLUE 8
#define	CYAN 9
#define	
#define	DARKOLIVEGREEN 11
#define	
#define	
#define	
#define	DARKTURQUOISE 15
#define	DIMGREY 16
#define	FIREBRICK 17
#define	FORESTGREEN 18
#define	GOLD 19
#define	GOLDENROD 20
#define	GREY 21
#define	GREEN 22
#define	GREENYELLOW 23
#define	INDIANRED 24
#define	KHAKI 25
#define	LIGHTBLUE 26
#define	
#define	LIGHTSTEELBLUE 28
#define	LIMEGREEN 29
#define	MAGENTA 30
#define	MARDON 31
#define	MEDIUHAQUAMARINE 32

#define MAXFONTS 6
#define COURIERBOLD10 1
#define COURIERBOLD12 2
#define COURIERBOLD14 3
#define COURIERBED10 4
#define COURIERBED15 5
#define COURIERMED14 6

#endif

#define MEDIUMBLUE 33
#define MEDIUMBLUE 34
#define MEDIUMSLATEBLUE 36
#define MEDIUMSLATEBLUE 36
#define MEDIUMSLATEBLUE 38
#define MEDIUMSURETRED 39
#define MEDIUMVIGLETRED 39
#define MEDIUMSPRINGERED 39
#define MEDIUMVIGLETRED 39
#define ORANGE 42
#define ORANGERED 43
#define ORANGERED 43
#define PINK 46
#define PINK 46
#define PINK 46
#define SALMON 49
#define SEARREEN 50
#define SEARREEN 50
#define SPRINGEREN 54
#define SPRINGEREN 54
#define SPRINGEREN 54
#define SPRINGEREN 54
#define SPRINGEREN 54
#define SPRINGEREN 54
#define VIOLETRED 60
#define VIOLETRED 60
#define VIOLETRED 60
#define WITTE 62
#define WITTE 62
#define WITTE 62
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#define WITTE 62

```
simSDE(xfer, sde_to_ge_channel[1], ge_to_sde_channel[0],
current_graph, action, sde_error_msgs, child_process);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    writeChkWord(SDEchkWord, sde_to_ge_channel[1]);
readChkWord((int *) &GEchkWord, ge_to_sde_channel[0]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     printf("SDE exiting...\n");
printf("\nSDE Xfer Buffer size: %\d\n", xfer->Max);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sprintf(kill_buf, "kill -9 %d ", child_process);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          init_sde_sim(current_graph, &sde_error_msgs);
while (next_action.reinvoke) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          printf("Error opening graphics editor\n");
                                                                                                 next_action;
action = &next_action;
                                                                                                                                                                                                  current_graph = &graph;
                                                                                                                                                                                                                                                     sde_error_msgs = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                         init_graph_desc(current_graph);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /* this is the child process */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (SDEchkWord == GEchkWord) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               close(sde_to_ge_channel[0]);
close(ge_to_sde_channel[1]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   next_action.reinvoke = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            close(sde_to_ge_channel[1]);
SDEchkWord = CHKWORD,
GEchkWord;
                                                                                                                                                                                                                                                                                                                                                                        create_xfer_buf(&xfer);
                                                                                                                                                                    GRAPH_DESC_NODE graph;
                                                                                                                                                                                                                                                                                                                                                                                                                                init_action(action);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         system(kill_buf);
                                                                                                                                                                                                                                                                                                     char kill_buf[50];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              char child_buf[2];
                                                                                                                                                                                                                                                                                                                                                    xfer = NULL;
                                                                                                 ACTION_NODE
                                                                                                                                                                                                                                                  ERROR_MSGS
                                                                                                                                                                                                  GRAPH_DESC
                                                                                                                          ACTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                9188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          write_error_string("cannot establish sde_to_ge_channel");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              write_error_string("cannot establish ge_to_sde_channel");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          write_error_string("cannot establish GE process");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             sprintf(ge_in, "%d", sde_to_ge_channel[0]);
sprintf(ge_out, "%d", ge_to_sde_channel[1]);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if ((child_process = fork()) == -1)
                                                                                                                                                                                                                                                                                                                                                    printf("error in parent: %s\n", s);
                #include <stdio.h>
#include <string.h>
#include <memory.h>
#include "inter_process_utilities.h"
#include "sde_simulator.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /* this is still the parent */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (pipe(sde_to_ge_channel) < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (pipe(ge_to_sde_channel) < 0)
                                                                                                                                                                      extern int sde_to_ge_channel[];
extern int ge_to_sde_channel[];
extern KferBuffer* zfer;
                                                                                                                                                                                                                                                                          void write_error_string(s)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 int child_process;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (child_process)
<unistd.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ge_in[100],
ge_out[100];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return;
                                                                                                                                                                                                                                                                                                     char *s;
#include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int
                                                                                                                                                                                                                                                                                                                                                                                                                           main()
```

```
write_error_string("cannot execute graph_editor");
    return;
}
                                                    execl("edit_graph", "edit_graph -geom 1200x750", ge_in, ge_out, (char *)0);
                       close(ge_to_sde_channel[0]);
                                                                                                 close(sde_to_ge_channel[0]);
close(ge_to_sde_channel[1]);
                                                                                                                                   *
                                                                                     *
```

#endif #ifndef sde_simulator_h #define sde_simulator_h 1 void simSDE();
void init_sde_sim(); #ifdef __cplusplus extern "C" { #endif #ifdef _NO_PROTO

void simSDE(XferBuffer *xfer, int ChlWrite, int ChlRead, GRAPH_DESC current_graph, ACTION action, ERROR_MSGS SDEerrs); void init_sde_sim(GRAPH_DESC current_graph, ERROR_MSGS sde_error_msgs); #ifdef __cplusplus } #endif

#endif

#0150

```
= dup_str("A little bit longer error message
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = dup_str(current_graph->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                              Err->parent_op_label = dup_str(current_graph->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str("403");
= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                      = dup_str(current_graph->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = dup_str(current_graph->current_op_name);
= dup_str("Error 6");
                                                                                                                                                                                                                                                                                                                                              = (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(current_graph->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = dup_str("Error 4");
= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = dup_str(current_graph->current_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = dup_str("Error 5");
= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                            Err->parent_op_label = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = dup_str(current_graph->parent_op_name);
= current_graph->current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Err->parent_op_label = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = current_graph->current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                   = current_graph->current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = current_graph->current_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = current_graph->current_op_num;
                                                                                                                                                                                                                                                            = current_graph->current_op_num;
                                                                                                                                                                                                                                                                                                                 = dup_str("Error at line 100");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = current_graph->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = current_graph->parent_op_num;
                                                                                                                                                                                                    = current_graph->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = current_graph->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = current_graph->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = current_graph->parent_op_num;
(char *) dup_str("TAEplus");
current_graph->avail_impl_langs->next->next->next
                                                                                                            Err = (ERRUR_MSGS) malloc(sizeof(ERRUR_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 "goes here ");
                                                          (ID_LIST) NULL;
                                                                                                                                          *sde_error_msgs = Err;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Err->parent_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Err->parent_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Err->parent_op_label
                                                                                                                                                                                                    Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                        Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Err->parent_op_num
                                                                                                                                                                                                                                                                                    Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                        Err = Err->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Err = Err->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Err = Err->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Err = Err->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Err = Err->next;
                                                                                                                                                                                                                                                            Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                   Err->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Err->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Err->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Err->next
                                                                                                                                                                                                                                                                                                                    Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = dup_str("Current op spec");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /* Initialize added stuff that is not read in from file */
current_graph->input_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              current_graph->current_op_name = (char *) dup_str("C");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      current_graph->parent_op_name = (char *) dup_str("B");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 current_graph->root_op_name = (char *) dup_str("A");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              current_graph->current_op_num = 3;
current_graph->cur_op_spec_met = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               current_graph->avail_impl_langs->next->next->id
                                                                                                                                                                    roid init_sde_sim(current_graph, sde_error_msgs)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       current_graph->avail_impl_langs->next->next
(ID_LIST) malloc(sizeof(ID_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        current_graph->cur_op_spec_met_unit = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  current_graph->avail_impl_langs
   (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (ID_LIST) malloc(sizeof(ID_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    current_graph->avail_impl_langs->next->id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             current_graph->avail_impl_langs->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    display_gdn(current_graph);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      current_graph->parent_op_num = 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (fp = fopen("GRAPH_DESC", "r")) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             current_graph->cur_op_is_terminator
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                current_graph->avail_impl_langs->id
                                                                                                          #include "inter_process_utilities.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          current_graph->graph_informal_desc
current_graph->avail_impl_langs
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  read_gdn_file(current_graph,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 current_graph->root_op_num = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (char *) dup_str("PSDL");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (char *) dup_str("Ada");
                                                                                                                                                                                                                                                                                                                                                                                                                                   init_graph_desc(current_graph);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  current_graph->global_types
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   current_graph->output_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   current_graph->cur_op_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          current_graph->timer_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     current_graph->input_list
                                                                                                                                                                                                                                                      ERROR_MSGS *sde_error_msgs;
                                                     #include "ge_utilities.h"
#include "sde_simulator.h"
                                                                                                                                                                                                                            GRAPH_DESC current_graph;
#include <stdio.h>
                                                                                                                                                                                                                                                                                                                                                                         ERROR_MSGS Err;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 fclose(fp);
                                                                                                                                                                                                                                                                                                                                           FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         else {
```

	Charles acceptable and acceptable acceptable and acceptable accept		
77977-117	- (EGROR_ROUS) MALLOC(SINGOI(ERROR_RODE));	Erracur op_num	= current_graph->current_op_num;
Err = Err->next;		Err->msg	
Err->parent_op_num	= current_graph->parent_op_num;	Err->next	
Err->parent_op_label	Err->parent_op_label = dup_str(current_graph->parent_op_name);		
Err->cur_op_num	= current_graph->current_op_num;	Err = Err->next;	
Err->cur_op_label	<pre>= dup_str(current_graph->current_op_name);</pre>	Err->parent_op_num	Ħ
Err->msg	= dup_str("Error 7");	Err->parent_op_label	= dup_str(current_graph->parent_op_name);
Err->next	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));	Err->cur_op_num	= current_graph->current_op_num;
		Err->cur_op_label	= dup_str(current_graph->current_op_name);
Err = Err->next;		Err->msg	= dup_str("Error 14");
Err->parent op num	= current graph->parent op num:	Err->next	
Err->parent op label			
Fre-Sour on num		Control of the contro	
Transfer Tob Turn	- current-graph-current-op-num;	Err = Err - Anext;	
Err->cur_op_label	<pre>= dup_str(current_graph->current_op_name);</pre>	Err->parent_op_num	H
Err->msg		Err->parent_op_label	U
Err->next	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));	Err->cur_op_num	<pre>= current_graph->current_op_num;</pre>
		Err->cur_op_label	= dup_str(current_graph->current_op_name);
Err = Err->next;		Err->nse	= dup str("Error 15"):
Err->parent_op_num	= current_graph->parent_op_num;	Err->nert	= (ERROR MSGS) malloc(sizeof(ERROR NODE)):
Err->parent op label	11		
Err->cur on num			
	the state of the s	in the court of th	
Err-/cur_op_raper		Err->parent_op_num	
Krr->#sg		Err->parent_op_label	10
Err->next	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));	Err->cur_op_num	<pre>= current_graph->current_op_num;</pre>
		Err->cur_op_label	<pre>= dup_str(current_graph->current_op_name);</pre>
Err = Err->next;		Err->msg	= dup_str("Error 16");
Err->parent_op_num	= current_graph->parent_op_num;	Err->nert	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
겋	= dup_str(current_graph->parent_op_name);		
Err->cur op num	11	Nor a Kern-Snawt.	
Frr->cur on label	m der constitution of the	Entrance of the control of the contr	
The section of the se	day of the tent and a graph contract of the co	mu"do"nuared / Tra	- current_graph-/parent_op_num;
Err->msg		Err->parent_op_label	
Err->next	<pre>= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));</pre>	Err->cur_op_num	
		Err->cur_op_label	<pre>= dup_str(current_graph->current_op_name);</pre>
Err = Err->next;		Err->msg	= dup_str("Error 17");
Err->parent_op_num	= current_graph->parent_op_num;	Err->next	
겋	= dup_str(current_graph->parent_op_name);		
Err->cur_op_num	= current_graph->current_op_num;	Err = Err->next;	
4	= dup_str(current_graph->current_op_name);	Err->parent op num	= current graph->parent op num:
Err->msg	= dup str("Error 11");	Err->parent on label	a dun str(current graph->parent on name):
Err->next	= (ERROR MSGS) malloc(sizeof(ERROR NODE)):	Err->cur on num	= current graph->current on num:
		Err->cur on label	
Err = Err->next:		Frr-Vmsq	
	and the state of t	Sem - III	
	- current_graph_/parent_op_mum;	TIL-Merr	
TageT	= dup_str(current_graph-)parent_op_name);		
	= current_graph->current_op_num;	LIT = EIT->neit;	
-ob-tabet	= dup_str(current_graph->current_op_name);	Err->parent_op_num	= current_graph->parent_op_num;
	= dup_str("Error 12");	Err->parent_op_label	<pre>= dup_str(current_graph->parent_op_name);</pre>
Err->next	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));	Err->cur_op_num	= current_graph->current_op_num;
		Err->cur_op_label	= dup_str(current_graph->current_op_name);
Err = Err->next;		Err->msg	= dup_str("Error 19");
Err->parent_op_num	<pre>= current_graph->parent_op_num;</pre>	Err->next	= (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
Err->parent_op_label	Err->parent_op_label = dup_str(current_graph->parent_op_name);		

```
if (action->option == SAVE_TO_DISK) { /* Print what edit_graph
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (action->reinvoke == true) {
   printf("SDE: Reinvoke with operator %s", action->next_op);
                                                                                                                                                                  /* returned upon exit.
                       /* Wait for return from edit_graph and read return data */
readGraphDesc(current_graph, xfer, ChlRead);
readAction(action, xfer, ChlRead);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     current_graph->current_op_name = action->next_op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   printf("SDE: Error finding file GRAPH_DESC\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       printf("SDE: Error finding file GRAPH_DESC\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              writeGraphDesc(current_graph, xfer, ChlWrite);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    sprintf(buffer, "kill -9 %d\n", child);
                                                                                                                                                                                                                                                                                                              else if (action->option == ABANDON) {
                                                                                                                                                                                                                                                                                                                                                                     if (fp = fopen("GRAPH_DESC","r")) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               printf("SDE: Revert psdl\n");
if (fp = fopen("GRAPH_DESC","r")) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else if (action->option == REVERT) {
                                                                                                                                                                                                                                                                                                                                                                                                  read_gdn_file(current_graph,fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         read_gdn_file(current_graph,fp);
                                                                                                                                                                                                                            write_gdn_file(current_graph,fp);
                                                                                                                                                                                                                                                                                                                                           printf("SDE: Abandon psdl\n");
                                                                                                                                                                printf("SDE: Save psdl\n");
fp = fopen("GRAPH_DESC","w");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 system(buffer);
                                                                                                                                                                                                                                                                                                                                                                                                                                 fclose(fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         fclose(fp);
                                                                                                                                                                                                                                                         fclose(fp);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else {
                                                                            = current_graph->current_op_num;
= dup_str(current_graph->current_op_name);
= dup_str("Error 20");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = current_graph->current_op_num;
= dup_str(current_graph->current_op_name);
= dup_str("Error 22...last");
                                                                                                                                                                                                                                                                                                                                             = dup_str(current_graph->current_op_name);
                            Err->parent_op_num = current_graph->parent_op_num;
Err->parent_op_label = dup_str(current_graph->parent_op_name);
                                                                                                                                                             = (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                  = (ERROR_MSGS) malloc(sizeof(ERROR_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Err->parent_op_num = current_graph->parent_op_num;
Err->parent_op_label = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                   Err->parent_op_label = dup_str(current_graph->parent_op_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void simSDE(xfer, ChlWrite, ChlRead, current_graph, action,
                                                                                                                                                                                                                                                                                                                = current_graph->current_op_num;
                                                                                                                                                                                                                                                         = current_graph->parent_op_num;
                                                                                                                                                                                                                                                                                                                                                                        = dup_str("Error 21");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SDEerrs, child)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GRAPH_DESC current_graph;
                                                                                                                                                                                                                                                         Err->parent_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Err->cur_op_num
Err->cur_op_label
                                                                                 Err->cur_op_num
Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                           Err->cur_op_label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ACTION action;
ERROR_MSGS SDEerrs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char buffer[100];
                                                                                                                                                                                                                                                                                                                                                                                                                                                            Err = Err->next;
Err = Err->next;
                                                                                                                                                                                                                            Err = Err->next:
                                                                                                                                                                                                                                                                                                                   Err->cur_op_num
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           KferBuffer *xfer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 child;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /* Send data */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        int ChlWrite;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int ChlRead;
                                                                                                                                                                  Err->next
                                                                                                                                                                                                                                                                                                                                                                                                       Err->next
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Err->nert
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  FILE *fp;
                                                                                                                                                                                                                                                                                                                                                                             Err->msg
                                                                                                                                        Err->msg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ACTION
```

* *

writeGraphDesc(current_graph, xfer, ChlWrite); writeErrorMsgs(SDEerrs, xfer, ChlWrite);

```
#ifdef __cplusplus } /* Close scope of 'extern "C"' declaration which encloses file. */ #endif
                                                                                                                                                                                                                                                   extern void
setcursor(Widget parent, int on, int cursornumber);
                                                                                                                                                                   extern void setcursor();
                                                                                                                                                                                                                                                                                                             #endif /* _NO_PROTO */
                                    #ifdef __cplusplus
extern "C" {
#endif
#define SETCURSOR_H
                                                                                                                     #ifdef _NO_PROTO
                                                                                                                                                                                                           #else
                                                                                                                                                                                                                                                                                                                                                         parent -- widget id of parent
on -- change cursor, True or False
cursornumber -- cursor to change to
                                                                                                                                                                                                                                                                                                                           * Created: 08/07/91

*include <X11/Intrinsic.b>
#include <X11/Intrinsic.b>
#include <X11/Intrinsic.b>
#include <X11/Inib.b>
#include <X11/Inib.b>
#include <Xm/Xm.b>
                                                                                Description: set cursor for current menu
                                                                                                                                                                                                           * Returned value: void
                                          * Function: setcursor
                                                                                                                                                                                                                                                                                          * Author: Not Roy
                                                                                                                                                                                                                                                Warnings:
                                                                                                                          Arguments:
```

#endif /* SETCURSOR_H */

#ifndef SETCURSOR_H

```
#ifdef __cplusplus } /* Close scope of 'extern "C"' declaration which encloses file. */ #endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XChangeWindowAttributes(xdisplay, xwindow, CWCursor, &attrs);
                                                                                                                                                                                                                                                                                                                                                                                                        cursor = XCreateFontCursor(xdisplay, cursornumber);
                                                                                                                                                                                                                                                                                                                                                                                                                                                     attrs.cursor = on? cursor : None;
                                                                                                                                                                                                                                                                                                                      xwindow = XtWindow(parent);
xdisplay = XtDisplay(parent);
                                                                                                                                                                                                               Window xwindow;
XSetWindowAttributes attrs;
Cursor cursor;
                                                                                                                                                #endif /* _NO_PROTO */
                                                                                                                                                                                        Display *xdisplay;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XFlush(xdisplay);
                                                                                                      int cursornumber)
                                                               Widget parent,
                                         setcursor(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return;
                     void
                                                                                                                                                                                                                                                                                                                        parent -- widget id of parent
on -- change cursor, True or False
cursornumber -- cursor to change to
                                         * Description: set cursor for current menu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     setcursor(parent, on, cursornumber)
                                                                                                                                                                                                                                                                                                                                                                #include <X11/Shell.h>
#include <X11/cursorfont.h>
#include <X11/Xlib.h>
#include <X11/Xlib.h>
                                                                                                                                                                                                                                                                                                                                            #include <X11/Intrinsic.h>
                                                                                                                                                                      * Returned value: void
* Function: setcursor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #include "setcursor.h"
                                                                                                                                                                                                                                                                                                   * Created: 08/07/91
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Widget parent;
int on;
int cursornumber;
                                                                                                                                                                                                                                                       * Author: Not Roy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #ifdef __cplusplus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #ifdef _NO_PROTO
                                                                                     * Arguments:
                                                                                                                                                                                                               * Warnings:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #endif
```

/* ***********************************	public:
	ne_node() {_next_ptr = NULL;}
	_spline_node(int x, int y) {_x = x; _y = y; _next_ptr = NULL;}
Author: Capt Robert M. Dixon	_spline_node(XYPAIR inpair)
Program: graph_editor	<pre>{_x = inpair.x; _y = inpair.y; _next_ptr = NULL;}</pre>
ij	virtual [spline_node() {
Remarks: Specification for the SplineObject class.	
	// printf("_spline_node Destructor: %d %d delete _next_ptr\n", _x, _y);
used in the graph_editor's splines. It stores a	delete _next_ptr;}
	}:
itself, point by point.	
	crass SplineUbject 4
In order to correctly terminate in the appropriate	protected:
rol points	static Widget _error_tgt;
shadow points' at the ends of the lines. Since	
b-splines don't normally end at the first and last	_spline_node *_head_ptr;
control points, the extra shadow points make the	BOULEAN _shadow_pts_set, _handles_drawn;
ייייי אין אין אין אין אין אין אין אין אי	int handle selected:
History:	
	void draw_arrowhead(GC graphics_context, StreamObject *parent,
@1 96/10/04 Ken Moeller	_spline_node *endpoint);
Removed un-needed routines to read and write to disk.	int num_points(_spline_node *p1, _spline_node *p2,
	spline_node *p3, _spline_node *p4);
62 95/10/UG Ken Moeller Otestal a neg routine to drite guline date to se interfere	public: setatio moid sat green tot (Didget midget) / serve tot - midget.
structure.	1000118 - 00011011911 (000118 000118/0001101191000 0100 0100 0100
	SplineObject();
/* 特别特种特别特别特别的特别特别的特别的特别的特别的特别的特别的特别的特别的特别的特别的特	virtual "SplineObject() {
#ifndef spline_object_h	#ifdef GE_DEBUG
#define spline_object_h 1	<pre>// printf("SplineObject Destructor: delete _head_ptr\n");</pre>
	#endif
#include <stdio.h></stdio.h>	<pre>delete _head_ptr; }</pre>
#include <x11 xlib.h=""></x11>	
#include <x11 intrinsic.h=""></x11>	E_PTR
#include <xm messageb.b=""></xm>	<pre>void build_from_sde(SPLINE_PTR sp);</pre>
#include "ge_defs.h"	<pre>CLASS_DEF is_a() {return SPLINEOBJECT;}</pre>
#include "ge_interface.h"	SplineObject& operator=(SplineObject&);
	void set_object_ptrs(OperatorObject *_from_ptr,
class UperatorUbject;	UperatorUbject *_to_ptr);
class StreamObject;	void draw(StreamUbject* parent, GC graphics_context,
	GC handle_context, DRAW_STYLE style,
// S. Decato 8/1/96	EXTERN_STATUS status);
// added the following class forward declaration	XYPAIR first_point();
// to avoid complaints from the friend definition	XYPAIR last_point();
class SplineObject;	void draw_handles(GC draw_context, StreamUbject *parent,
	int xI, int yI);
Class spille node (VOIG CEGAT();
briothed:	COLEMENTARY ().
	XYPATR next neit():
_spline_node *_next_ptr;	BOOLEAN hit(int x, int y);

BODLEAN over(int x, int y); // Added 8/26/96, dha void set_text_location(int kname_x, int kname_y, int klatency_y; void set_name_location(int kname_x, int kname_y); void set_latency_location(int name_x, int name_y); void set_offset_defaults(int x_pos, int *y_pos); void set_offset_defaults(int x_pos, int *y_pos); void set_extern_location(XYPAIR &catern_location, EXTERN_STATUS status); BOOLEAN hit_handle(int x, int y); BYIERN_STATUS status); void move_handle(int x, int y);

BOOLEAN empty() {return _head_ptr == NULL;}
void erase_handle(GC graphics_context, StreamObject *parent);
void reset_handles_drawn() {_handles_drawn = FALSE;}

#endif

XSetFunction(parent->display_ptr(), draw_context, GXcopy); XSetFunction(parent->display_ptr(), draw_context, GXzor); cout << "Spline: " << (x1 - (HANDLESIZE / 2)) << " " <<
 (y1 - (HANDLESIZE / 2)) << " " << HANDLESIZE << endl;</pre> draw_context, (x1 - (HANDLESIZE / 2)),
(y1 - (HANDLESIZE / 2)), HANDLESIZE, *(parent->drawing_area_pixmap()), draw_context, (x1 - (HANDLESIZE / 2)), (y1 - (HANDLESIZE / 2)), HANDLESIZE, StreamObject *parent, int x1, // Initializes the static error target widget. void SplineObject::draw_handles(GC draw_context, XFillRectangle(parent->display_ptr(), XFillRectangle(parent->display_ptr(), // Draws a handle at the given coordinates. parent->draw_window(), int y1) { Widget SplineObject::_error_tgt = NULL; HANDLESIZE); HANDLESIZE); SplineObject::SplineObject() { #define ARROWSIDELENGTH 10.0 #include "operator_object.h" #include "warning.h" _iter = NULL; _shadow_pts_set = FALSE; _handle_selected = NONE; #include "spline_object.h" #include "stream_object.h" = FALSE; #define EXTERN_OFFSET 30 #define ARROWANGLE 45.0 #define HITDISTANCE 10 #define SKIPFACTOR 4 #include "ge_defs.h" #include <string.h> #include <stream.h> #include <math.h> _handles_drawn #define NONE 0 #ifdef GEDEBUG head_ptr #endif Created a new routine to write spline data to ge_interface The SplineObject is used to create the curved lines Young, Douglas, Object Oriented Programming With C++ In order to correctly terminate in the appropriate Heller, Dan, Motif Programming Manual, O'Reilly and used in the graph_editor's splines. It stores a linked list of control points which it uses to draw Portions of code are adapted from the following: 'shadow points' at the ends of the lines. Since b-splines don't normally end at the first and last Barakati, Naba, X Window System Programming, SAMS, Zyda, Michael, Book Number 5, Graphics and Video locations, it adds special control points I call control points, the extra shadow points make the Laboratory, Naval Postgraduate School, 1990. Johnson, Eric, and Reichard, Kevin, X Window Applications Programming, MIS Press, 1989. Implementation of the SplineObject class. Formula for b-spline curves comes from: and OSF/Motif, Prentice-Hall, 1992. Removed code to read and write to disk. curve stop in the right place. Capt Robert M. Dizon Spline loop did not exit. itself, point by point spline_object.C Associates, 1991. 96/10/04 Ken Moeller 96/10/06 Ken Moeller 96/10/03 Ken Moeller Program: graph_editor Date Modified: 17 Sep 92

<stdio.h>

tinclude

Remarks:

Author:

Name:

Credits:

#include <stdlib.h>

structure.

63

62

History:

6

```
// Returns the coordinates of the first point in the spline.
                                                                SplineObject& SplineObject::operator=(SplineObject& spline) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        // Returns the coordinates of the last point in the spline.
                                                                                                                                                                                                                                                                                                                                                                                                           target_temp_ptr->_next_ptr = new _spline_node;
                                                                                                                                                                                                                                                                                                                                                                                                                                             target_temp_ptr = target_temp_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            source_temp_ptr = source_temp_ptr->_next_ptr;
                                                                                                  _spline_node *source_temp_ptr, *target_temp_ptr;
                                                                                                                                                                                                                                                                                                        source_temp_ptr = spline._head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               target_temp_ptr->_x = source_temp_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          target_temp_ptr->_y = source_temp_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          while(temp_node_ptr->_next_ptr != NULL)
                                                                                                                                                                                                  _head_ptr = new _spline_node;
_head_ptr->_x = spline._head_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             spline_node *temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                      _head_ptr->_y = spline._head_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                      while(source_temp_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XYPAIR SplineObject::first_point() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_pair.x = temp_node_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_pair.y = temp_node_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XYPAIR SplineObject::last_point() {
                                                                                                                                                                   if(spline._head_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                       target_temp_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_pair.x = _head_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_pair.y = _head_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_head_ptr != NULL) {
// Assignment operator.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(_head_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_pair.x = 0;
temp_pair.y = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XYPAIR temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XYPAIR temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         return *this;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else {
```

```
while (temp_node_ptr->_next_ptr->_next_ptr->_next_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _spline_node *temp_node_ptr, *temp_head_ptr, *temp_node_ptr2;
                                                                       // NULL. Also adds the necessary shadow and intercept points,
                                                                                                                                                  // Splines with externals must always have at least one point.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             AYPAIR from_intercept, to_intercept, temp_pair, first_point,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         OperatorObject *_to_ptr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void SplineObject::set_object_ptrs(OperatorObject *_from_ptr,
                                                                                                              // and adds a control point for streams defined without one.
                                                                                                                                                                                                                         // Streams with external endpoints use the last control
// point as the physical endpoint of the spline. Otherwise,
// the attached operator provides the coordinates for the
                                                                                                                                                                                                                                                                                                                                                                                                                             In a spline with shadow points, the points are stored in the linked list in the following order:
Sets _from_ptr and _to_ptr to the operators at either
                                   // end of the spline. Pointers for external streams equal
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // strips off existing intercept and shadow points. For
// externals, the intercept points are saved.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       'from' intercept point - 'from' shadow point
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        'to' shadow point - 'to' intercept point -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_node_ptr = _head_ptr->_next_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_pair.x = temp_node_ptr->_next_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_pair.y = temp_node_ptr->_next_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_node_ptr2->_next_ptr->_next_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                               // intercept point, i.e. the spline endpoint.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (defined control points) -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_pair.x = _head_ptr->_next_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_pair.y = _head_ptr->_next_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  delete temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_node_ptr->_next_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 from_intercept = temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(_shadow_pts_set == TRUE) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_node_ptr2 = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    to_intercept = temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_from_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if(_to_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           last_point;
                                                                                                                                                                                                                                                                                                                                                                                                                             :::::
```

temp_pair.x = 0; temp_pair.y = 0; } return temp_pair;

```
while(temp_node_ptr->_next_ptr->_next_ptr != NULL)
                                                                                                                                                                                                                                          "External streams must have at least one control point");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 "External streams must have at least one control point");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_pair.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_node_ptr = temp_node_ptr->_next_ptr;
to_intercept.x = temp_node_ptr->_next_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      to_intercept.y = temp_node_ptr->_next_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               from_intercept = _from_ptr->intercept(temp_pair.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(temp_node_ptr->_next_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                    from_intercept.x = temp_node_ptr->_x;
from_intercept.y = temp_node_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          to_intercept.x = temp_node_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         to_intercept.y = temp_node_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   delete temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_node_ptr->_next_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                             head_ptr = head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_node_ptr->_next_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (temp_pair.y - from_intercept.y);
temp_pair = this->last_point();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (temp_pair.x - from_intercept.x);
first_point.y = from_intercept.y -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             first_point.x = from_intercept.x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_pair = this->first_point();
                                                                                                                                                                                                                                                                                                                                                                      temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     delete temp_node_ptr;
                               _head_ptr = temp_node_ptr;
                                                                                                                                                                               if(_head_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               delete temp_node_ptr;
                                                                                                                                                if(_from_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(_head_ptr == NULL)
                                                                                                                                                                                                                 warning(_error_tgt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    warning (_error_tgt,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _head_ptr = NULL;
                                                                                                                   _shadow_pts_set = TRUE;
delete temp_node_ptr2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(_to_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(_head_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(_from_ptr != NULL)
                                                                                                                                                                                                                                                                               return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
```

```
temp_head_ptr->_next_ptr = new _spline_node(from_intercept);
temp_node_ptr = temp_head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_head_ptr->_next_ptr = new _spline_node(from_intercept);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_node_ptr = temp_node_ptr->_next_ptr;
temp_node_ptr->_next_ptr = new _spline_node(to_intercept);
temp_node_ptr->_next_ptr->_next_ptr =
new _spline_node(last_point);
_head_ptr = temp_head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_node_ptr->_next_ptr = new _spline_node(to_intercept);
temp_node_ptr->_next_ptr->_next_ptr =
    new _spline_node(last_point);
_head_ptr = temp_head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      to_intercept.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               from_intercept.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_node_ptr->_next_ptr = new _spline_node(temp_pair);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  from_intercept = _from_ptr->intercept(to_intercept.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_pair.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     to_intercept = _to_ptr->intercept(from_intercept.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       from_intercept.x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       from_intercept.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            temp_pair.z = (from_intercept.x + to_intercept.x) / 2;
temp_pair.y = (from_intercept.y + to_intercept.y) / 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        from_intercept = _from_ptr->intercept(temp_pair.r,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                first_point.x = from_intercept.x - (temp_pair.x -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  to_intercept.x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     to_intercept.y);
                                                                      temp_pair.y);
                                                                                                                                             to_intercept.x);
                                                                                                                                                                                                              to_intercept.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       first_point.y = from_intercept.y - (temp_pair.y -
                                      to_intercept = _to_ptr->intercept(temp_pair.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           last_point.x = to_intercept.x - (temp_pair.x -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               last_point.y = to_intercept.y - (temp_pair.y -
                                                                                                          last_point.x = to_intercept.x - (temp_pair.x -
                                                                                                                                                                                                                                           temp_head_ptr = new _spline_node(first_point);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_head_ptr = new _spline_node(first_point);
                                                                                                                                                                    last_point.y = to_intercept.y - (temp_pair.y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 from_intercept.y);
                                                                                                                                                                                                                                                                                                                                                                                                                                temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _to_ptr->intercept(from_intercept.x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_node_ptr = temp_head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                         while(temp_node_ptr->_next_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                  temp_node_ptr->_next_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_pair = _to_ptr->center();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if(_from_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_to_ptr == NULL)
if(_to_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                to_intercept =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    else (
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              else (
```

```
int points;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  float inc;
                                                                                                                                                                                                                                                                                                                             else {
                                                                          int SplineObject::num_points(_spline_node *p1, _spline_node *p2
Determines the number of points to be calculated for the
                                                                                                                            _spline_node *p4) {
int distance, number_points = 0;
                                                                                                          _spline_node *p3,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 distance = abs(p3->_x - p4->_x);
                                                                                                                                                                                                                                           distance = abs(p1->_x - p2->_x);
                                                                                                                                                                                                                                                                                                                             distance = abs(p1-,x - p3-x);
                                                                                                                                                                                                                                                                                                                                                                                                             distance = abs(p1-\_x - p4-\_x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          distance = abs(p2->_x - p3->_x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       distance = abs(p2->_x - p4->_x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                distance = abs(p1-y_y - p2-y_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                distance = abs(p1->_y - p3->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             distance = abs(p1->_y - p4->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               distance = abs(p^{2-}, y - p^{3-}y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              distance = abs(p2->_y - p4->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      distance = abs(p3->_y - p4->_y);
                                                                                                                                                                                                                                                                    if (distance > number_points)
                                                                                                                                                                                                                                                                                                                                                         if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                        if (distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(distance > number_points)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if(distance > number_points)
                                                                                                                                                                                                                                                                                             number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                               number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                              number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  number_points = distance;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return number_points;
                                                                                                                                                                                                                if(p4 != NULL) {
                        // spline.
```

Draws the arrowheads for the line.

>

```
vertices[1].x = (short) (endpoint->_x - (cos(temp_angle)); + ARROWSIDELENGIH);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ARROWSIDELENGTH));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ARROWSIDELENGIH)):
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               vertices[2].x = (short) (endpoint->_x - (cos(temp_angle) *
                                                                                  double angle, temp_angle;
double half_arrow_angle = ARROWANGLE / 2.0 * M_PI / 180.0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            vertices[2].y = (short) (endpoint->_y - (sin(temp_angle) *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // Draws the spline point by point, and if the coordinates
// are near a spline point, TRUE is returned.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XFillPolygon(parent->display_ptr(), parent->draw_window(),
StreamObject *parent, _spline_node *endpoint) {
                                                                                                                                                                                                                                                                                                                                                                                                                  graphics_context, vertices, 3, Convex,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       *(parent->drawing_area_pixmap()),
graphics_context, vertices, 3, Convex,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         float t, t2, t3, term1, term2, term3, term4, x, y;
                                                         _spline_node *last_point = endpoint->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BOOLEAN SplineObject::hit(int in_x, int in_y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_angle = angle - half_arrow_angle;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_angle = angle + half_arrow_angle;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if((last_point->_x < endpoint->_x))
                                                                                                                                                                                                      if(last_point->_x == endpoint->_x) {
  if(last_point->_y > endpoint->_y)
  angle = M_PI / 2.0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XFillPolygon(parent->display_ptr(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _spline_node *p1, *p2, *p3, *p4;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CoordModeOrigin);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CoordModeOrigin);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    vertices[0].x = endpoint->_x;
vertices[0].y = endpoint->_y;
                                                                                                                                                                                                                                                                                                                                angle = 3.0 * M_PI / 2.0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   angle = M_PI + angle;
                                                                                                                                                  XPoint vertices[3];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           p2 = p1->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  p1 = _head_ptr;
```

void SplineObject::draw_arrowhead(GC graphics_context,

```
/* Debug code
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               else {
                                                                                                                                                                                                                                                                                                                                                                                                 *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GC graphics_context, GC handle_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         float inc, t, t2, t3, term1, term2, term3, term4, x, y; _spline_node *p1, *p2, *p3, *p4, *temp_node_ptr; BOOLEAN need_handles;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            points = num_points(p1, p2, p3, p4) / SKIPFACTUR;
                                                                                                                                                                             term1 = (-t3 + (3 * t2) - (3 * t) +1);

term2 = ((3 * t3) - (t2 * 6) + 4);

term3 = ((-3 * t3) + (3 * t2) + (3 * t) + 1);
                                          points = num_points(p1, p2, p3, p4) / SKIPFACTOR;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EXTERN_STATUS status) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if((abs((int) x - in_x) < HITDISTANCE) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // Draws the spline using the control points.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (abs((int) y - in_y) < HITDISTANCE))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void SplineObject::draw(StreamObject *parent,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DRAW_STYLE style,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   p1 = _head_ptr;

p2 = p1->_next_ptr;

p3 = p2->_next_ptr;

p4 = p3->_next_ptr;

points = num_points(p1, p2, p3, p4);

while(p4 != NULL) {
                                                                                                               for(t = 0.0; t \le 1.0; t = inc) {
                                                                                     inc = 1.0 / (float) points;
                                                                                                                                                                                                                                                                                                                                                                                                                                     y += term2 * p2--y;
y += term3 * p3->-y;
y += term4 * p4->-y;
y /= 6.0;
                                                                                                                                                                                                                                                                           x = term1 * p1->_x;
x += term2 * p2->_x;
x += term3 * p3->_x;
                                                                                                                                                                                                                                                                                                                                             x += term4 * p4->_x;
x /= 6.0;
                                                                                                                                                                                                                                                                                                                                                                                                                        y = term1 * p1->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      )
p1 = p2;
p2 = p3;
p3 = p4;
p4 = p4->_next_ptr;
                                                                while(p4 != NULL) {
                     p4 = p3->_next_ptr;
p3 = p2-_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return TRUE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int points, i, j;
                                                                                                                                                                                                                                               term4 = t3;
                                                                                                                                                              t3 = t2 * t;
                                                                                                                                         t2 = t * t;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return FALSE;
```

```
printf("Bogus draw p3:: %d id: %d", p3->_x, parent->id());
if((p3->_y > 1000) || (p3->_y < 0))
    printf("Bogus draw p3:: %d id: %d", p3->_y, parent->id());
if((p4->_x > 1000) || (p4->_x < 0))
    printf("Bogus draw p4:: %d id: %d", p4->_x, parent->id());
if((p4->_y > 1000) || (p4->_y < 0))
    printf("Bogus draw p4:: %d id: %d", p4->_x, parent->id());
printf("Bogus draw p4y: %d id: %d", p4->_y, parent->id());
if((p1->_x > 1000) || (p1->_x < 0))
printf("Bogus draw plx: %d id: %d", p1->_x, parent->id());
if((p1->_y > 1000) || (p1->_y < 0))
                                                                                                 printf("Bogus draw ply: %d id: %d", p1->-y, parent->id()); if((p2->_x > 1000) || (p2->_x < 0))
                                                                                                                                                            printf("Bogus draw p2x: %d id: %d", p2->_x, parent->id()); if((p2->_y > 1000) || (p2->_y < 0)) printf("Bogus draw p2y: %d id: %d", p2->_y, parent->id()); if((p3->_x > 1000) || (p3->_x < 0))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(parent->is_state_variable()) { // draw thicker line
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *(parent->drawing_area_pixmap()),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  for(j = (int) y - 1; j < (int) y + 1; j++) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *(parent->drawing_area_pixmap()),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    term3 = ((-3 * t3) + (3 * t2) + (3 * t) + 1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       for(i = (int) x - 1; i < (int) x + 1; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             graphics_context, i, j);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           graphics_context, i, j);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XDrawPoint(parent->display_ptr(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            parent->draw_window(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XDrawPoint(parent->display_ptr(),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      term1 = (-t3 + (3 * t2) - (3 * t) +1);
term2 = ((3 * t3) - (t2 * 6) + 4);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              for(t = 0.0; t <= 1.0; t += inc) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          inc = 1.0 / (float) points;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                x = term1 * p1->_x;
x += term2 * p2->_x;
x += term3 * p3->_x;
x += term4 * p4->_x;
x /= 6.0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              y += term2 * p2->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                y = term1 * p1->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           y += term3 * p3->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            y += term4 * p4->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      t3 = t2 * t;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           t2 = t * t;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  term4 = t3;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      y /= 6.0;
```

```
temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                           while(temp_node_ptr->_next_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _spline_node *temp_node_ptr = _head_ptr;
                                                                                                                                                                                                      _head_ptr = new _spline_node(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int temp_x, temp_y, i, num_nodes = 0;
                                                       printf("Bogus spline x: %d", x); if((y > 900) || (y < 0))
                                                                                                                  printf("Bogus spline y: %d", x);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XYPAIR SplineObject::next_pair() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void SplineObject::reset_iter() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              while(temp_node_ptr != NULL)
                                                                                                                                                                                                                                                                 temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_pair.x = _iter->_x;
temp_pair.y = _iter->_y;
_iter = _iter->_next_ptr;
  /* Debug code
if((x > 900) || (x < 0))
                                                                                                                                                                         if(_head_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(_iter == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_pair.r = -1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_pair.y = -1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _iter = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XYPAIR temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return temp_pair;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   num_nodes++;
                                                                                                                                                                                                                                 else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        draw_handles(handle_context, parent, temp_node_ptr->_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    draw_handles(handle_context, parent, temp_node_ptr->_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw_arrowhead(graphics_context, parent, temp_node_ptr);
if(parent->is_selected() && (status == TO_EXTERNAL) &&
need_handles)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 draw_handles(handle_context, parent, temp_node_ptr->_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(parent->is_selected() && (status == FROM_EXTERNAL) &&
                                                                                                                                                                                                                                                                                      if(((_handles_drawn == FALSE) tk (style == SOLID)) ||
((_handles_drawn == TRUE) tk (style == ERASE)))
graphics_context, (int) x, (int) y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          while(temp_node_ptr->_next_ptr->_next_ptr != NULL) {
   if(parent->is_selected() && need_handles)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Adds a new control point to the spline.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                    points = num_points(p1, p2, p3, p4);
                                                                                                                                                                                                                                                              temp_node_ptr = _head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_node_ptr->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      void SplineObject::add(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_node_ptr->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_node_ptr->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  // Erases the control points.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _spline_node *temp_node_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(_handles_drawn == TRUE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _handles_drawn = FALSE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void SplineObject::clear() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _handles_drawn = TRUE;
                                                                                                                                                                                                                                                                                                                                                                                                           need_handles = FALSE;
                                                                                  p1 = p2;
p2 = p3;
p3 = p4;
p4 = p4->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                   need_handles = TRUE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if(need_handles) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    delete _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _head_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                need_handles)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 =
```

```
void SplineObject::set_name_location(int &name_x, int &name_y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Resets the iterator pointer to the beginning of the spline.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // Places the name between the middle two control points.
                                                                                                                                                                                                                                                                    // Returns the control point pointed to by the iterator
                                                      temp_node_ptr->_next_ptr = new _spline_node(x, y);
temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                          // pointer, then advances the iterator pointer.
```

```
temp_x = (temp_node_ptr->_x + temp_node_ptr->_next_ptr->_x) / 2;
temp_y = (temp_node_ptr->_y + temp_node_ptr->_next_ptr->_y) / 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ((temp_node_ptr->_x) + (HANDLESIZE / 2) + HITFUDGE)) &&
(((temp_node_ptr->_y) - (HANDLESIZE / 2) - HITFUDGE) <= y) &&
(y <= ((temp_node_ptr->_y) + (HANDLESIZE / 2) + HITFUDGE))) {
    _handle_selected = num_handle;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     <= x) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ((temp_node_ptr->_x) + (HANDLESIZE / 2) + HITFUDGE)) & (((temp_node_ptr->_y) - (HANDLESIZE / 2) - HITFUDGE)
   // even, take midpoint
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   while(temp_node_ptr->_next_ptr->_next_ptr != NULL) {
   if((((temp_node_ptr->_x) - (HANDLESIZE / 2) - HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if((((temp_node_ptr->_x) - (HANDLESIZE / 2) - HITFUDGE)
                                                                                                                                                                                                                                                                                                                                                                                                                Checks to see if the coordinates are within any of the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (y <= (temp_node_ptr->_y) + (HANDLESIZE / 2) +
HITFUDGE))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BOOLEAN SplineObject::hit_handle(int x, int y, EXTERN_STATUS status) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _spline_node *temp_node_ptr = _head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                            // handles, or within the ends of external streams.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _handle_selected = num_handle;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(status != FROM_EXTERNAL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(status == TO_EXTERNAL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _handle_selected = NONE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int num_handle = 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return TRUE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return TRUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                <= y) &&
                                                                                                                                                                                                                               *y_pos = temp_y;
                                                                                                                                                                                                      *x_pos = temp_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    num_handle++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 num_handle++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return FALSE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        => ±)
else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void SplineObject::set_offset_defaults(int *x_pos, int *y_pos) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void SplineObject::set_latency_location(int temp_x, int temp_y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void SplineObject::set_text_location(int &name_x, int &name_y,
                                                                                                                                                                   (temp_node_ptr->_x + temp_node_ptr->_next_ptr->_x) / 2;
                                                                                                                                                                                                                                      (temp_node_ptr->_y + temp_node_ptr->_next_ptr->_y) / 2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            set_latency_location(name_x, name_y, latency_x, latency_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // odd numer of nodes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       int &latency_x, int &latency_y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Convenience function for setting the text location.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int &latency_x, int &latency_y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // Places the latency location underneath the name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   int temp_x = 0, temp_y = 0, i = 0, num_nodes = 0;
                                                                                                           temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   temp_x = temp_node_ptr->_next_ptr->_x;
temp_y = temp_node_ptr->_next_ptr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _spline_node *temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_node_ptr = _head_ptr;
if (_head_ptr != NULL) {
  for (i = 1; i < num_nodes / 2; i++)</pre>
                                                                     for(i = 1; i < num_nodes / 2; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             set_name_location(name_x, name_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while(temp_node_ptr != NULL) {
      temp_node_ptr = _head_ptr;
if(_head_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 latency_y = temp_y + 15;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (num_nodes%2) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  latency_x = temp_x;
                                                                                                                                                                                                                                                                                                              name_x = temp_x;
                                                                                                                                                                                                                                                                                                                                          name_y = temp_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 num_nodes++;
```

```
SPLINE_PTR SplineObject::write_to_sde(EXTERN_STATUS status) { // @3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  spPtr->next = (SPLINE_PTR) malloc(sizeof(SPLINE_NUDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       spPtr->next = (SPLINE_PTR) malloc(sizeof(SPLINE_NGDE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          head = (SPLINE_PTR) malloc(sizeof(SPLINE_NUDE));
                                                                                                                                                                                                                                           ((shadow_ptr->_y) - (intercept_ptr->_y)) * ((shadow_ptr->_x) - (intercept_ptr->_x));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      while (snPtr->_next_ptr->_next_ptr != NULL) {
   if (spPtr == NULL) {
                                                                                                                                                                                                                  temp_x = (temp_y - intercept_ptr->_y) /
temp_y = intercept_ptr->_y - 7;
if(shadow_ptr->_y == intercept_ptr->_y)
if(shadow_ptr->_x > intercept_ptr->_x)
temp_x = EXTENN_OFFSET;
                                                                                                                                                                                                                                                                                                                                          if(shadow_ptr->_x > intercept_ptr->_x)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           snPtr = snPtr->_next_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _spline_node *snPtr = _head_ptr;
                                                                                                                                                                                                                                                                                                    if(abs(temp_x) > EXTERN_OFFSET)
                                                                                                                                                                                                                                                                                                                                                                                                                            temp_x = -EXTERN_OFFSET;
                                                                                                                                                                                                                                                                                                                                                                                                                                                        temp_x += intercept_ptr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (status == FROM_EXTERNAL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (status == TO_EXTERNAL) {
                                                                                                                                                      temp_x = -EXTERN_OFFSET;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    extern_location.x = temp_x;
                                                                                                                                                                                                                                                                                                                                                                temp_x = EXTERN_OFFSET;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               extern_location.y = temp_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SPLINE_PTR head = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              spPtr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 snPtr = snPtr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  snPtr = snPtr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = snPtr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = snPtr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = snPtr->_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = snPtr->_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                spPtr = spPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        spPtr = spPtr->next;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 spPtr->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     spPtr->next = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           spPtr = head;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_y += 10;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          spPtr->x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              spPtr->x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SPLINE_PTR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      spPtr->y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            spPtr->y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       else {
                                                                                                                                                                                                                                                                                                                                                                                                 6188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void SplineObject::set_extern_location(XYPAIR &extern_location,
EXTERN_STATUS status) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  draw_handles(graphics_context, parent, temp_node_ptr->_x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _spline_node *temp_node_ptr, *intercept_ptr, *shadow_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // Determines the location for the 'EXTERNAL' label on
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           while(temp_node_ptr->_next_ptr->_next_ptr != NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      StreamObject *parent) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void SplineObject::erase_handle(GC graphics_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                            void SplineObject::move_handle(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                temp_node_ptr = temp_node_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        shadow_ptr = temp_node_ptr->_next_ptr;
                                                                                                                _spline_node *temp_node_ptr = _head_ptr;
int i;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _spline_node *temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          intercept_ptr = _head_ptr->_next_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(shadow_ptr->_y > intercept_ptr->_y)
                                                                                                                                                                                                                  for(i = 1; i < _handle_selected; i++)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            for(i = 1; i < _handle_selected; i++)</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         intercept_ptr = temp_node_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          temp_y = intercept_ptr->_y + 7;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      temp_node_ptr->_y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_node_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(status == FROM_EXTERNAL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(status == TO_EXTERNAL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Erases the given handle
                                      // Moves a spline handle.
                                                                                                                                                                                                                                                                                                                                     if(temp_node_ptr->_x < 0)
                                                                                                                                                                                                                                                                                                                                                                                              if(temp_node_ptr->_y < 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              shadow_ptr = _head_ptr;
                                                                                                                                                                                                                                                                                                                                                                   temp_node_ptr->_x = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                            temp_node_ptr->_y = 0;
                                                                                                                                                                                                                                                                              temp_node_ptr->_x += x;
                                                                                                                                                                                                                                                                                                          temp_node_ptr->_y += y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int temp_x, temp_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // the drawing.
```

```
}
else {
   temp_node_ptr->_next_ptr = new _spline_node(sp->x, sp->y);
   temp_node_ptr = temp_node_ptr->_next_ptr;
                              vhile (sp != NULL) {
  if (.head_ptr == NULL) {
    .head_ptr = new _spline_node(sp->r, sp->y);
    temp_node_ptr = _head_ptr;
temp_node_ptr = NULL;
                                                                                                                                                            sp = sp->next;
}
                                                                                                 void SplineObject::build_from_sde(SPLINE_PTR sp) {
                                                                                                                                  _spline_node *temp_node_ptr;
                                                                                                                                                                                                   _iter = NULL;
_shadow_pts_set = FALSE;
_handle_selected = NONE;
_handles_drawn = FALSE;
                                                                                                                                                                  this->clear();
   }
return head;
}
```

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	. () 446 4404 44.	
	inc cext_width();	
<pre>void set_default_text_location(); void StreamObject::draw_handles(GC draw_context, int x1, int y2);</pre>	void delete_notify(CLASS_DEF class void undelete_notify(CLASS_DEF cla void move_notify(CLASS_DEF object_ void move_handle(int x, int y) {_x void reset_handles_drawn_state(); void est_handles_drawn_state();	void delete_notify(CLASS_DEF class_type, OP_ID deleted_obj_id); void undelete_notify(CLASS_DEF class_type, OP_ID deleted_obj_id); void move_notify(CLASS_DEF object_type, OP_ID object_id); void move_handle(int x, int y) {_arc.move_handle(x, y);} void reset_handles_drawn_state(); void acset_handles_drawn_state();
public:	<pre>void set_object_ptrs(from tout_int); void set_object_ptrs(from tout_int);</pre>	JbjectList *parent);
StreamObject();	<pre>void set_text_dimensions(); void text_locate(int x, int y);</pre>	(A)
StreamObject(STREAM st);	void set_default_name_location();	tion();
StreamObject(char *in_name_ptr, OP_ID in_id, OP_ID in_from,	<pre>void set_default_latency_location();</pre>	ocation();
SplineObject *in_arc_ptr,	void inherit_type(StreamObject *fromPtr);	<pre>ject *fromPtr);</pre>
BOOLEAN in_is_new, BOOLEAN in_is_state_variable);		
<pre>virtual "StreamObject();</pre>	<pre>SPLINE_PTR write_spline_to_sde(EXTERN_STATUS status) { return _arc.write_to_sde(status); }</pre>	sde(EXTERN_STATUS status)
StreamObject& operator=(StreamObject& src);		
void copy(STREAM &st, OP_LIST op_list);	int x()	{return _x;}
	int y()	{return _y;}
	void x(int x)	{"x = x"}
STREAM build_st(StreamObject *st, OP_LIST op_list); // @4	void y(int y)	$\{-y = y;\}$
STREAM CODY(UP_LIST OP_11St);	+62	Mathode to Gat paluae/05
Void copy(StreamObject *src);	•ct	
void release();		
void initialize();	ST_ID id()	<pre>{return _id;}</pre>
CLASS_DEF is_a() {return STREAMOBJECT;}	char *name()	<pre>{return dup_str(_name_ptr);}</pre>
	int name_font()	{return _name_font;}
void draw(DRAW_STYLE style);		{return _name_x;}
void erase();	int name_y()	{return _name_y;}
<pre>void erase_handle() {_arc.erase_handle(_graphics_context, this);};</pre>	Company of an	fractions from 1
VOID GERWINDLING (DARWING BOOKE);	OP ID to()	fraturn to:}
void erase_text();		
void move_text(int x, int y);	OperatorObject* from_ptr()	{return _from_ptr;}
void select():	operatorus de la compara	Technia -co-pui;
<pre>void unselect();</pre>	SplineObject arc()	{return _arc;}
BOOLEAN hit(int x, int y);		{ return _latency; }
BOOLEAN bit_handle(int x, int y);		{ return _latency_unit; }
BUOLEAN over(int x, int y); // Added 8/26/96, dha		f return _latency_font; }
ROOTEAN is calacted() (return is selected;)	int latency v()	<pre>f return latency v: }</pre>
BOOLEAN text_selected()		
{return (_name_selected _latency_selected);}	char* stream_type_name()	<pre>{return dup_str(_stream_type_name);}</pre>
BOOLEAN spline_empty() {return _arc.empty();}	char* state_initial_value()	char* state_initial_value() {return dup_str(_state_initial_value);}
int text_height();	BOOLEAN is_state_variable()	BOOLEAN is_state_variable() {return _is_state_variable;}

```
//@5
{ _latency_y = y; }
                                                                                                                                                             void state_initial_value(char* in_ptr) {
    delete _state_initial_value;
    _state_initial_value = dup_str(in_ptr);
}
                                                                                                                                                                                                                                                                                                                                                                                                      void set_modified() {_is_modified = true;}
void set_deleted() {_is_deleted = true;}
                                                             delete _stream_type_name;
_stream_type_name = dup_str(in_ptr);
}
                                                                                                                                                                                                                                                                                                                                                {_is_state_variable = state;}
                                                        void stream_type_name(char *in_ptr) {
                                                                                                                                                                                                                                                                                                                     void is_state_variable(BUULEAN state)
void latency_y(int y)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #endif;
                                                                                                                                                                                                                                                                                                                                                                                                   void from(OP_ID f)
{_to = t; _trom_ptr = NULL;}
void to(OP_ID t)
{_to = t; _to_ptr = NULL;}
void from_ptr(OperatorObject *0) {_from_ptr = 0; _from = 0->id();}
void to_ptr(OperatorObject *0) {_to_ptr = 0; _from = 0->id();}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void latency(int t) { _latency = t; }
void latency_unit(int units) { _latency_unit = units; }
void latency(int latency, int unit);
void latency_font(int font) { _latency_unit = font; }
                                                                                                                                                                                                                                      void name(char *new_name);
void replace_name(char *new_name);
void name_fout(int name_font) {_name_font = name_font;}
                          {return _is_new;}
{return _is_modified;}
{return _is_deleted;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           {-latency_x = x;}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void arc(SplineObject arc_ptr) {_arc = arc_ptr;}
                                                                                                                                  Methods to Set values
                                                                                                                                                                                                                                                                                                                       {_name_x = x;}
{_name_y = y;}
                                                                                                                                                                                        {_id = id;};
                          BOOLEAN is_new()
BOOLEAN is_modified()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           void latency_x(int x)
                                                                                BUOLEAN is_deleted()
                                                                                                                                                                                                                                                                                                                       void name_x(int x)
void name_y(int y)
                                                                                                                                                                                     void id(ST_ID id)
```

```
// kbm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // printf("StreamDbject Destructor called for: %s\n", _name_ptr);
#endif
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StreamObject::StreamObject(char *in_name_ptr, OP_ID in_id,
                                                                                                                                                                                                                                                                                                                                                  StreamUbject::StreamObject(STREAM st) : GraphObject() {
                                                                                                                                                                                                                                                                                              // StreamObject built from SDE interface -- DL 9/10/96
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = *in_arc_ptr; // deep copy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BOOLEAN in_is_state_variable) : GraphObject() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(in_name_ptr);
= in_from;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = in_is_state_variable;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SplineObject *in_arc_ptr, BOOLEAN in_is_new,
                                                                                                                                StreamObject::StreamObject() : GraphObject() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OP_ID in_from, OP_ID in_to, int in_latency,
                        // 01
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    latency(in_latency, in_latency_unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = in_is_new;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             in_id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = in_to;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               StreamObject:: "StreamObject() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  reset_handles_drawn_state();
#include "graph_object_list.h"
                                                                          #define MAX_CONTROL_POINTS 100
                      #include "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int in_latency_unit,
                                                                                                                                                                                                                                                                                                                                                                                                                                 this->read_from(st);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _is_state_variable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #ifdef GE_DEBUG
                                                                                                                                                                                                                                                                                                                                                                                                      initialize();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         initialize();
                                                                                                                                                                                    initialize();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               from_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _to_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Latency did not recognized UNDEFINED_TIME. PROBLEM TO FIX: _latency is still using negative values.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Young, Douglas, Object Oriented Programming With C++ and OSF/Motif, Prentice-Hall, 1992.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Heller, Dan, Motif Programming Manual, O'Reilly and
                                                                                                                                                                                                                                        The StreamObject is a graphical representation of
                                                                                                                                                                                                                                                                                                                                                                                                                                                               Portions of code are adapted from the following:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Barakati, Naba, X Window System Programming, SAMS,
                                                                                                                                                                                                                                                                                       bepline specified by a series of control points. Streams automatically connect to their attached operators, and always have arrowheads at their
                                                                                                                                                                                                                                                                   a curved PSDL stream. The stream is drawn as a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Removed build_from_property and write_to_property.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Johnson, Eric, and Reichard, Kevin, X Window
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Applications Programming, MIS Press, 1989.
                                                                                                                                                                                 Remarks: Implementation of the StreamObject class.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Removed code to read and write to disk.
                                                                            stream_object.C
Capt Robert M. Dixon
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Fixes to latency units.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Associates, 1991.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     96/10/03 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     New build_st function.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          96/10/04 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              96/10/06 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             96/10/06 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          96/10/06 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                terminating points.
                                                                                                                                Program: graph_editor
Date Modified: 11 Sep 92
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #include "stream_object.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #include <string.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #include <stdlib.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #include <stream.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                               Credits:
                                                                                                       Author:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            History:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 63
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          65
```

StreamObject& StreamObject::operator=(StreamObject& src) {

```
_latency_handles_drawn = true;
                                                                                                                                      yN_pos = _y + _name_y;
xL_pos = _x + _latency_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(_latency_selected) {
                                                                                                                                                                                                            yL_pos = _y + _latency_y
                                                                                                      xN_pos = _x + _name_x;
                                                                                                                                                                                                                                                                                                                                                                                           if(style == ERASE)
                                         xL_pos, yL_pos;
int xN_pos, yN_pos,
                                                                                                                                                                                                                                                                                  if(style == SOLID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              void StreamObject::draw_handles(GC draw_context, int x1, int y1,
int x2, int y2) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y1, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            draw_context, x2 - HANDLESIZE, y2 - HANDLESIZE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Draws handles around the specified location. Handles are
// drawn in exclusive-or mode to simplify erasing them without
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XFillRectangle(_display_ptr, *_drawing_area_pizmap,
draw_context, x2 - HANDLESIZE, y1, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XFillRectangle(_display_ptr, *_drawing_area_pixmap,
draw_context, x1, y2 - HANDLESIZE, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XFillRectangle(_display_ptr, _draw_window, draw_context, x1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    x2 - HANDLESIZE, y1, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XFillRectangle(_display_ptr, _draw_window, draw_context, x1, y2 - HANDLESIZE, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XFillRectangle(_display_ptr, _draw_window, draw_context,
x2 - HANDLESIZE, y2 - HANDLESIZE, HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XFillRectangle (_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XFillRectangle (_display_ptr, *_drawing_area_pixmap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KSetFunction(_display_ptr, draw_context, GXcopy);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XSetFunction(_display_ptr, draw_context, GXxor);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void StreamObject::draw_text(DRAW_STYLE style) {
                                                                                                                                                                                                                                                                                                                  STREAM st = (STREAM) malloc(sizeof(ST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                y1, HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                            STREAM StreamObject::clone(OP_LIST op_list) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            HANDLESIZE, HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // disturbing the underlying text.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                           write_to(st, op_list);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // Draws text strings.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GC draw_context;
                                                                                                                                  return *this;
                                                                   copy (ksrc);
                               release();
                                                                                                                                                                                                                                                                                                                                                                                                                                                              return st;
```

```
if((_latency_handles_drawn == false) && (style == SOLID)) {
                                                                                                                                                                                  xN_pos, yN_pos, _name_ptr, strlen(_name_ptr));
XDrawString(_display_ptr, *_drawing_area_pixmap, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // 01
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            draw_handles(_graphics_context, xL_pos - HANDLESIZE,
   yL_pos - _latency_height - HANDLESIZE,
   xL_pos + _latency_width + HANDLESIZE,
   yL_pos + HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if((_name_handles_drawn == true) && (style == ERASE)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       draw_handles(_graphics_context, xN_pos - HANDLESIZE,
                                                                                                                                                                                                                                                 xN_pos, yN_pos, _name_ptr, strlen(_name_ptr));
if(_name_selected) {
                                                                                                                                                                                                                                                                                                                                   if((_name_handles_drawn == false) && (style == SOLID))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  set_font(draw_context, _latency_font);
XDrawString(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              yN_pos - _name_height - HANDLESIZE,
                                                                                                                                                      XDrawString(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             xN_pos + _name_width + HANDLESIZE,
yN_pos + HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             xL_pos, yL_pos, _latency_string_ptr,
strlen(_latency_string_ptr));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      strlen(_latency_string_ptr));
draw_context = _graphics_context;
                                                                                                                       set_font(draw_context, _name_font);
                                                                                          draw_context = _erase_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              _name_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _latency_string_ptr,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(_latency != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                             _name_handles_drawn = true;
```

```
if(((x)=xN_pos)\ kk\ (x<=(xN_pos+_name_width)))\ kk\ (y>=yN_pos-_name_height)\ kk\ (y<=yN_pos))\ \{
                                                                                                                  XDrawString(_display_ptr, _draw_window, draw_context,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Returns true if the given coordinates are close to the
                                                                                                                                                extern_location.x, extern_location.y,
                                                                                                                                                                                                            XDrawString(_display_ptr, *_drawing_area_pixmap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // line, or within the boundaries of the text strings.
                              _arc.set_extern_location(extern_location,
                                                                                                                                                                              "External", strlen("External"));
                                                                                                                                                                                                                                             draw_context, extern_location.x,
                                                         TO_EXTERNAL);
                                                                                                                                                                                                                                                                   extern_location.y, "External",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(strlen(_latency_string_ptr) != 0)
if(((x >= xL_pos) &k
    (x <= (xL_pos + _latency_width))) &k
    (y >= yL_pos - _latency_height) &k
    (y <= yL_pos) .</pre>
                                                                                       set_font(draw_context, _name_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BOOLEAN StreamObject::hit(int x, int y) {
                                                                                                                                                                                                                                                                                                 strlen("External"));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(_latency_string_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _latency_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _name_selected = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(strlen(_name_ptr) != 0)
if(_to_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void StreamObject::erase() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               yN_pos = _y + _name_y;
xL_pos = _x + _latency_x;
yL_pos = _y + _latency_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if(_name_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         xN_pos = _x + _name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                xL_pos, yL_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  int xN_pos, yN_pos,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(_is_deleted)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         draw(ERASE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _arc.draw(this, draw_context, _graphics_context, style, status);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // Writes the graphic attributes of the stream to disk. // GE_STATUS StreamObject::write_to_disk(FILE *outfile) //02
                                                                                                                                                                   yL_pos - _latency_height - HANDLESIZE,
                                                                                                                                                                                                  xL_pos + _latency_width + HANDLESIZE,
yL_pos + HANDLESIZE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Draws the stream. The actual curved line is contained
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if((_from_ptr == NULL) || (_to_ptr == NULL)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _arc.set_extern_location(extern_location, FROM_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_is_deleted == false) {
   if((_irom_ptr != NULL) || (_to_ptr != NULL)) {
    if(style == SOLID)
                                                         if((_latency_handles_drawn == true) &&
    (style == ERASE)) {
                                                                                                                                           xL_pos - HANDLESIZE,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void StreamObject::draw(DRAW_STYLE style) {
                                                                                                                        draw_handles(_graphics_context,
                                                                                                                                                                                                                                             _latency_handles_drawn = false;
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          draw_context = _dotted_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         draw_context = _graphics_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              draw_context = _erase_context;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // in a spline, which draws itself.
                                                                                                                                                                                                                                                                                                                                                                                                                                                       void StreamObject::erase_text() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 status = FROM_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           status = TO_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  status = NO_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if(_from_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(_to_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(_from_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if(style == ERASE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           EXTERN_STATUS status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   draw_text(style);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           draw_text(ERASE);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GC draw_context;
```

```
/* set_default_text_location is only called if _name_x == NULL_VALUE */
// if (_name_x == NULL_VALUE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void StreamObject::move_notify(CLASS_DEF object_type, OP_ID object_id) {
                                                target_object(OPERATOROBJECT, _to);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // Notifies the stream that the given object has been deleted.
// If it's an operator connected to the stream, the stream
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ((_from == deleted_obj_id) || (_to == deleted_obj_id))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           // Notifies the stream that the given object has moved. If
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // it's a connected object, the endpoints of the stream must
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if ((_from == object_id) || (_to == object_id)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void StreamObject::delete_notify(CLASS_DEF class_type
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void StreamObject::replace_name(char *new_name) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 arc.set_object_ptrs(_from_ptr, _to_ptr);
_arc.set_offset_defaults(&r_pos, &y_pos);
                                                                                                                                                                       _arc.set_object_ptrs(_from_ptr, _to_ptr);
                                                                                                                                                                                                                                  _arc.set_offset_defaults(&x_pos, &y_pos);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void StreamObject::name(char *new_name) {
_to_ptr = (OperatorObject *) parent->
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (object_type == OPERATOROBJECT) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if((class_type == OPERATOROBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                    /* modified by M.T.Shing, 3/7/94 */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // set_default_text_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             free(_name_ptr);
_name_ptr = dup_str(new_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _name_ptr = dup_str(new_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _is_deleted = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(_name_ptr); '
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          int x_pos, y_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    // deletes itself.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    erase();
                                                                                                                                                                                                                                                                                                   x(x_pos);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      target_object(OPERATOROBJECT, _from);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(((x >= xN_pos) \ kk \ (x <= (xN_pos + _name_width))) \ kk \ (y >= yN_pos - _name_height) \ kk \ (y <= yN_pos) \ (x >= yN_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Sets the _from_ptr and _to_ptr equal to the locations of
the from and to operators. Simplifies getting properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            void StreamObject::set_object_ptrs(GraphObjectList *parent) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (x <= (xL_pos + _latency_width))) &&
(y >= yL_pos - _latency_height) &&
(y <= yL_pos)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _from_ptr = (OperatorObject *) parent->
                                                                                                                                                                                                                                                                                                                                                   BOOLEAN StreamObject::over(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(strlen(_latency_string_ptr) != 0)
if(((x >= xL_pos) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if(_latency_string_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if(strlen(_name_ptr) != 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                of the operators when needed.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (_from != UNDEFINED_OPNUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            _to_ptr = NULL;
if (_to != UNDEFINED_OPNUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if(_name_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        xL_pos = _x + _latency_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              yL_pos = _y + _latency_y;
                                                                                                                 return _arc.hit(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       return _arc.hit(x, y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            xN_pos = _x + _name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             yN_pos = _y + _name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          return true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      xL_pos, yL_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int xN_pos, yN_pos,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              int x_pos, y_pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _from_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return false;
else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if(_is_deleted)
```

```
// 04
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _name_font and _latency_font must be set before calling!
                                                                                                                                                                                                                                                                                                                                                       Sets latency from the value entered in the properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _latency_height = font_text_height(_latency_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _name_width = font_text_width(_name_font, _name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _latency_string_ptr = time_with_units(latency, unit);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Sets values for the dimensions of the text strings.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                / 01
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _latency_width = font_text_width(_latency_font,
                                                                                                                                                           void StreamObject::set_default_latency_location() {
                                                                                                                                                                                                                  _latency_x = 0;
_latency_y = 2 + font_text_height(_latency_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                       woid StreamObject::latency(int latency, int unit) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      _name_height = font_text_height(_name_font);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void StreamObject::set_text_dimensions() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               set_text_dimensions();
if (old_latency == UNDEFINED_TIME)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      set_default_latency_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(_latency != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     int old_latency = _latency;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(_latency_string_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if(_name_ptr == NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _latency_height = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _latency_unit = unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _latency_width = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _name_height = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _latency = latency;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _name_width = 0;
                           _name_x = 0;
_name_y = -2;
                                                                                                                                                                                                                                                                                                                                                                                // dialog box.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else {
                                                                                                                             if ((object_type == STREAMOBJECT) && (object_id == _id)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // Returns true if any of the stream's handles enclose the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOOLEAN StreamObject::hit_handle(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void StreamObject::set_default_text_location() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void StreamObject::set_default_name_location() {
                                                                                                                                                        _arc.set_object_ptrs(_from_ptr, _to_ptr);
_arc.set_offset_defaults(&x_pos, &y_pos);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        return _arc.hit_handle(x, y, status);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         set_default_latency_location();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   void StreamObject::unselect() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             set_default_name_location();
                                                                                                                                                                                                                                                                                                                                                       void StreamObject::select() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _name_selected = false;
_latency_selected = false;
draw(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             status = NO_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if(_to_ptr == NULL)
status = TO_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        status = FROM_EXTERNAL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _is_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EXTERN_STATUS status;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               if(_from_ptr == NULL)
                                                                                                                                                                                                                                                                                                                                                                                                                                  _is_selected = true;
draw(SQLID);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             // given coordinates.
x(x_pos);
y(y_pos);
                                                                                                                                                                                                                  x(x_pos);
                                                                                                                                                                                                                                              y(y_pos);
                                                                                                                                                                                                                                                                                                                                                                                                            erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        erase();
```

```
The handles_drawn states are used to prevent the handles
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // from accidentally redrawing and erasing a handle.
                                                                                                                                                                                                                                                                                                                                             if(_from_ptr->is_deleted() == false) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void StreamObject::reset_handles_drawn_state() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _latency_selected = false;
_latency_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _latency_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                            _name_selected = false;
                                                                                                                                                                                              _latency_selected = false;
                                                                                                                                                                                                                                                                                             if(_to == deleted_obj_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _is_modified = true;
_is_selected = false;
_name_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                        _is_selected = false;
                                                                                                                                                                                                                                                                                                                                                                          _is_deleted = false;
                                                                                                                                                                                                                                                                                                                                                                                                 _is_modified = true;
                                                                                                                                                                                                                                                                                                                  if(_from_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 _name_handles_drawn = false;
_latency_handles_drawn = false;
                                                                                                                                                                     name_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int StreamObject::text_height() {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  _is_deleted = false;
                                                                                                                                          _is_selected = false;
                                                                                            _is_deleted = false;
                                                                                                                   _is_modified = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _arc.reset_handles_drawn();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             return _latency_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _st_handles_drawn = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if(_latency_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return _name_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (_name_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      0180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // Notifies the stream that the given object has been // undeleted. If it's an object connected to the stream, // the stream may need to undelete itself. The undeleted object
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // Moves appropriate text strings the given amount.
void StreamObject::set_object_font(int font_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if(_to_ptr->is_deleted() == false) {
                                                                                                                                                                                                                                                                                               void StreamObject::move_text(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if((class_type == OPERATOROBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if((class_type == STREAMOBJECT) &&
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (_is_deleted == true)) {
if(_from == deleted_obj_id) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _is_modified = true;
_is_selected = false;
_name_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _is_deleted = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (deleted_obj_id == _id)) {
    _is_deleted = false;
                                                                                                                                            _latency_font = font_id;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 // could be the stream itself.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _latency_selected = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if(_to_ptr != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                if (_latency_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _name_selected = false;
                                                 _name_font = font_id;
else
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _is_modified = true;
_is_selected = false;
                                                                                                                   if(_latency_selected)
                                                                                                                                                                   set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                        if (_name_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _latency_x += x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _latency_y += y;
                                               if (_name_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           draw_text(SOLID);
                                                                                                                                                                                                                                                                                                                                                                                                   _name_x += x;
                                                                                                                                                                                                                                                                                                                                                                                                                          _name_y += y;
                                                                                                                                                                                                                                                                                                                                               erase_text();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          0158
```

```
<del>/*****************************</del>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     * that the OperatorObjects have already been built (build_op) since * ge_interface.h includes OPERATOR pointers within the STREAM structure.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               92
                       = st->write_spline_to_sde(TD_EXTERNAL);
                                                                      = st->urite_spline_to_sde(NO_EXTERNAL);
                                                                                                                                                                                                                                                       geStPtr->stream_type_name = dup_str(st->stream_type_name());
geStPtr->state_initial_value = dup_str(st->state_initial_value());
geStPtr->is_state_variable = st->is_state_variable();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              * Builds a STREAM from a StreamObject. NOTE: This routine assumes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = arc.write_to_sde(FRON_EXTERNAL);
else if (_to == EXTERNAL_VERIEX_NUM)
StPt-----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = _arc.write_to_sde(TO_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = _arc.write_to_sde(NO_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void StreamObject::copy(STREAM &st, OP_LIST op_list) {
                                                                                                                                                  = st->latency_unit();
= st->latency_font();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               STREAM StPtr = (STREAM) malloc(sizeof(ST_NODE));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = dup_str(_name_ptr);
                                                                                                                                                                                                                                                                                                                                                        = st->is_modified();
                                                                                                                                                                                                                                                                                                                                                                                         = st->is_deleted();
else if (geStPtr->to == EXTERNAL_VERTEX_NUM)
                                                                                                                                                                                                        = st->latency_x();
                                                                                                                                                                                                                             = st->latency_y();
                                                                                                                            = st->latency();
                                                                                                                                                                                                                                                                                                                                     = st->is_new();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = _name_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = _name_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = _name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = _from;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (_from == EXTERNAL_VERTEX_NUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      __to;
                                                                                                                                                                                                        geStPtr->latency_x_offset
                                                                                                                                                                                                                               geStPtr->latency_y_offset
                                                                                                                                                    geStPtr->latency_unit
                                                                                                                                                                              geStPtr->latency_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        StPtr->label_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                StPtr->label_y_offset
                                                                                                                                                                                                                                                                                                                                                          geStPtr->is_modified
                                                                                                                                                                                                                                                                                                                                                                                      geStPtr->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StPtr->label_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (_arc.empty())
StPtr->arc
                         geStPtr->arc
                                                                      geStPtr->arc
                                                                                                                            geStPtr->latency
                                                                                                                                                                                                                                                                                                                                     geStPtr->is_new
                                                                                                                                                                                                                                                                                                                                                                                                                                        return geStPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       StPtr->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          StPtr->from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              st = StPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             StPtr->id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   StPtr->to
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * copy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             * ge_interface.h includes OPERATOR pointers within the STREAM structure.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = st->write_spline_to_sde(FROM_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            * Builds a STREAM from a StreamObject. NOTE: This routine assumes
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 * that the OperatorObjects have already been built (build_op) since
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      STREAM geStPtr = (STREAM) malloc(sizeof(ST_LIST_NUDE));
                                                                                                                                                                                                                                                                                                                                     // Relocates the appropriate text strings at the given
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    STREAM build_st(StreamObject *st, OP_LIST op_list) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(st->name());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _latency_x = (x - _x) - (_latency_width / 2);
_latency_y = (y - _y) + (_latency_height / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = st->name_font();
                                                                                                                                                                                                                                                                                                                                                                                                                void StreamObject::text_locate(int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    _name_x = (x - _x) - (_name_width / 2);
_name_y = (y - _y) + (_name_height / 2);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      if (geStPtr->from == EXTERNAL_VERTEX_NUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = st->name_x();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = st->name_y();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = st->from();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = st->id();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = st->to();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = NULL;
                                                 int StreamObject::text_width() {
                                                                                                                                                                                                        return _latency_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if(_latency_selected) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   geStPtr->label_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          geStPtr->label_y_offset
                                                                                                                                                                              if(_latency_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (st->spline_empty())
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if(_name_selected) {
                                                                                                                          return _name_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           geStPtr->label_font
                                                                                                  if(_name_selected)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             geStPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      geStPtr->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               geStPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      geStPtr->from
                                                                                                                                                                                                                                                         return 0;
                                                                                                                                                                                                                                                                                                                                                            // locations.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          geStPtr->id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   geStPtr->to
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        * build_st
```

```
// must follow name & latency font
                                                                                                                                                                                                                                                                                                                                                                                      // kbm
// kbm
                                                                                                                                                                                  // kbm
                                                                                                                                                                                                                                                                                                          // къп
                                                                                                                                                                                                                                                                                                                                              // kbm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      // printf("StreamObject::release called for: %s\n", _name_ptr);
                                                                                                                                                                              _stream_type_name = dup_str(st->stream_type_name);
_state_initial_value = dup_str(st->state_initial_value);
                                                                                                                                                                                                                          _is_state_variable = st->is_state_variable;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = dup_str(src->_name_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void StreamObject::copy(StreamObject *src) {
                                                                                                                                       = st->latency_x_offset;
                                                                                                   _latency_font = st->latency_font;
latency(st->latency, st->latency_unit);
                                                                                                                                                            = st->latency_y_offset;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = src->_name_font;
                                                                                                                                                                                                                                                                 = false;
                                                                                                                                                                                                                                                                                                          = false:
                                                                                                                                                                                                                                                                                                                               = false;
                                                                              _arc.build_from_sde(st->arc);
                                                                                                                                                                                                                                                                                                                                                                                                            reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         void StreamObject::release() {
                                                          = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _latency_string_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = NULL;
                                                                                                                                                                                                                                                                                    = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _state_initial_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free (_state_initial_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free (_latency_string_ptr);
 = st->from;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free (_stream_type_name);
                                                                                                                                                                                                                                            = false;
                                                                                                                                                                                                                                                                                                                                                                                         set_text_dimensions();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = src->_id;
                                       = st->to;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _stream_type_name
                                                                                                                                                                                                                                                                                                                                                    _latency_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _from_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   _to_ptr = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free(_name_ptr);
                                                                                                                                                                                                                                                                                                                               _name_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       _arc.clear();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #ifdef GE_DEBUG
                                                                                                                                                                                                                                                               _is_modified
                                                                                                                                                                                                                                                                                                         _is_selected
                                                                                                                                                                                                                                                                                      _is_deleted
                                                                                                                                           _latency_x
                                                                                                                                                               _latency_y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _name_font
                      _from_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        _name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _name_ptr
                                                            _to_ptr
                                                                                                                                                                                                                                                  ls_new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Pi-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // kbm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = _arc.urite_to_sde(FROM_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = _arc.write_to_sde(TO_EXTERNAL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = _arc.write_to_sde(ND_EXTERNAL);
                                                                                                   StPtr->stream_type_name = dup_str(_stream_type_name);
StPtr->state_initial_value = dup_str(_state_initial_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           StPtr->stream_type_name = dup_str(_stream_type_name);
StPtr->state_initial_value = dup_str(_state_initial_value);
                                                                                                                                                                                                                                                                 void StreamObject::write_to(STREAM StPtr, OP_LIST op_list ) {
                                                                                                                                         = _is_state_variable;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = _is_state_variable;
= _is_new;
                                                                                                                                                                                                                                                                                                                             = dup_str(_name_ptr);
                                                                                                                                                             = _is_new;
= _is_modified;
= _is_deleted;
                  = _latency_unit;
                                       = _latency_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = _latency_unit;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = _latency_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = _is_modified;
                                                            = _latency_x;
                                                                              = _latency_y;
                                                                                                                                                                                                                                                                                                                                                  = _name_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = _is_deleted;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = _latency_x;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = _latency_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void StreamObject::read_from(STREAM st) {
 = _latency;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else if (_to == EXTERNAL_VERTEX_NUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = _latency;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = dup_str(st->label);
                                                                                                                                                                                                                                                                                                                                                                       = _name_x;
                                                                                                                                                                                                                                                                                                                                                                                         = _name_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = st->label_x_offset;
= st->label_y_offset;
                                                                                                                                                                                                                                                                                                                                                                                                            _from;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (_from == EXTERNAL_VERTEX_NUM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = st->label_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                   _to;
                                                                                                                                           StPtr->is_state_variable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   StPtr->is_state_variable
                                                          StPtr->latency_x_offset
                                                                              StPtr->latency_y_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     StPtr->latency_x_offset
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      StPtr->latency_y_offset
                                                                                                                                                                                                                                                                                                                                                                     StPtr->label_x_offset
                                                                                                                                                                                                                                                                                                                                                                                        StPtr->label_y_offset
                  StPtr->latency_unit
                                       StPtr->latency_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            StPtr->latency_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               StPtr->latency_font
                                                                                                                                                                                StPtr->is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          StPtr->is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                if (_arc.empty())
                                                                                                                                                                                                       StPtr->is_deleted
                                                                                                                                                                                                                                                                                                                                                  StPtr->label_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 StPtr->is_deleted
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   StPtr->arc
StPtr->latency
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         StPtr->latency
                                                                                                                                                            StPtr->is_new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     StPtr->is_new
                                                                                                                                                                                                                                                                                                                               StPtr->label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        StPtr->arc
                                                                                                                                                                                                                                                                                                                                                                                                              StPtr->from
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  name_font
                                                                                                                                                                                                                                                                                                                                                                                                                                 StPtr->to
                                                                                                                                                                                                                                                                                                          StPtr->id
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              name_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       name_x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _паше_у
```

```
initialized by SplineObject constructor
                                                                                                         // @3
// kbm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void StreamObject::inherit_type(StreamObject *fromPtr) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              is_state_variable(fromPtr->is_state_variable());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   fromString = fromPtr->state_initial_value();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              fromString = fromPtr->stream_type_name();
                                   = UNDEFINED_OPNUM;
= UNDEFINED_OPNUM;
                                                                                        = UNDEFINED_TIME;
                                                                                                                             = dup_str("");
                                                                                                                                              = _default_font;
= NULL_VALUE;
                                                                                                                                                                                                        = dup_str("");
                                                                                                                                                                                                                    = dup_str("");
                                                                                                                                                                                     = NULL_VALUE;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        state_initial_value(fromString);
                                                                                                                                                                                                                                            = false;
                                                                                                                                                                                                                                                              = false;
                                                                                                                                                                                                                                                                                 = false;
                                                                                                                                                                                                                                                                                                  = false;
                                                                                                                                                                                                                                                                                                                                      = false;
                                                                                                                                                                                                                                                                                                                                                                          = false;
                                                                                                                                                                                                                                                                                                                                                       = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                stream_type_name(fromString);
                                                                                                                                                                                                                                                                                                                                                                                                            reset_handles_drawn_state();
                                                                                                                                                                                                                                                                                                                                                                                       set_text_dimensions();
                                                                                                                                                                                                                         state_initial_value
                                                                                                                               _latency_string_ptr
_latency_font
                                                                                                                                                                                                                                            is_state_variable
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   free(fromString);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(fromString);
                                                                                                                                                                                                        _stream_type_name
                                                                                                                                                                                                                                                                                                                                                                          _latency_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        char *fromString;
                                                                                                                                                                                                                                                                                                                                                       _name_selected
                                                                                                              _latency_unit
                                                                                                                                                                                                                                                                              is_modified
                                                                                                                                                                                                                                                                                                                                      _is_selected
                                                                                                                                                                                                                                                                                                    is_deleted
                                                                                                                                                                    _latency_x
                                                                                                                                                                                     _latency_y
                      _from_ptr
                                                                                             _latency
                                                                       _arc
                                                                                                                                                                                                                                                                is_new
                                                         to_ptr
                                                                                                                                                                                                                                            _state_initial_value = dup_str(src->_state_initial_value);
                                                                                                                                                                                                                                                                                                                                                                                            = dup_str(src->_latency_string_ptr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       // kbm
                                                                                                                                                                                                                         = dup_str(src->_stream_type_name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                _latency_handles_drawn = src->_latency_handles_drawn;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = src->_latency_selected;
= src->_st_handles_drawn;
= src->_name_handles_drawn;
                                                                                                                                                                                                                                                             _is_state_variable = src->_is_state_variable;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = src->_handle_selected;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = src->extern_location;
                                                                                                                                                                                                                                                                                                                                                                                                             = src->_latency_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                  = src->_latency_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = src->_name_selected;
                                                                                                                                                  = src->_latency_unit;
= src->_latency_font;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = src->name_location;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = src->_is_selected;
                                                                                                                                                                                                                                                                                               = src->_is_modified;
                                                                                                                                                                                                                                                                                                                                                         = src->_name_height;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = src->lat_location;
                                                                                                                                                                                                                                                                                                                                                                           = src->_name_width;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = UNDEFINED_OPNUM;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = _default_font;
= NULL_VALUE;
= NULL_VALUE;
                                                                                                                                                                                                                                                                                                                     = src->_is_deleted;
                                                           = src->_from_ptr;
                                                                                                                                 = src->_latency;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = dup_str("");
                                                                                                                                                                                       = src->_latency_x;
                                                                                           = src->_to_ptr;
                                                                                                                                                                                                        = src->_latency_y;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 void StreamObject::initialize() {
                                                                                                                                                                                                                                                                                 = src->_is_new;
                       = src->_name_y;
     = src->_name_x;
                                          = src->_from;
                                                                                                                 = src->_arc;
                                                                            = src->_to;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             st_handles_drawn
_name_handles_drawn
                                                                                                                                                                                                                            _stream_type_name
                                                                                                                                                                                                                                                                                                                                                                                                _latency_string_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            latency_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     _handle_selected
                                                                                                                                                                                                                                                                                                                                                                                                                 _latency_height
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         extern_location
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       name_selected
                                                                                                                                                                                                                                                                                                                                                                                                                                  _latency_width
                                                                                                                                                  latency_unit
                                                                                                                                                                      _latency_font
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      name_location
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _is_selected
                                                                                                                                                                                                                                                                                                is_modified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        lat_location
                                                                                                                                                                                                                                                                                                                                                          name_height
                                                                                                                                                                                                                                                                                                                       is_deleted
                                                                                                                                                                                                                                                                                                                                                                           name_width
                                                                                                                                                                                       _latency_x
                                                                                                                                                                                                          _latency_y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             _name_font
                                                             from_ptr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           _name_ptr
                                                                                                                                  latency
                                                                                               _to_ptr
                                                                                                                                                                                                                                                                                   is new
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                name_x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               _name_y
                       name_y
      name_x
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        jid.
                                                                               ş
```

#include <Xm/MessageB.h>
#include "graph_object_list.h"
#include "partor_object.h"
#include "stream_object.h"
#include "stream_object.h"
#include <Xm/Xm.h>
#include <Xm/Xm.h>
#itndet STREAM_PROPERTY_MENU_H
#define STREAM_PROPERTY_MENU_H

#endif /* STREAM_PROPERTY_MENU_H */

Project PRDL Editor PRDL Editor PRDL Editor PRDL Editor PROJECT PRDL Editor PROJECT PROJ	***************	*
in Gull Canton Stream Properties er: Man-Tak Shing ion: This package is responsible for producing the pop-up dow for displaying and maintaining the properties of a stream. dow for displaying and maintaining the properties of a stream. dow for displaying and maintaining the properties of a stream. dow for displaying and maintaining the properties of a stream. StreamObject that is being updated is provided by being_updated, which is a global symbol. It is expected to set prior to calling stream_property_dialog. set prior to calling stream_property_dialog. set prior to calling stream_property_dialog. sem_ok_cb sem_ok_cc set_office sem_ok_cc sem_ok_c		* Suggested Modifications:
er: Man-Tak Shing er: Man-Tak Shing er: C++ C++ ion: This package is responsible for producing the pop-up dow for displaying and maintaining the properties of a stream. eam_property_dialog is the main routine. Several callback tines are also provided. StreamObject that is being updated is provided by set prior to calling stream_property_dialog. It is expected to set prior to calling stream_property_dialog. set prior to calling stream. set prior to dialog stream. set prior to calling stream. set prior to dialog stream. set pri		the state of the s
wan-Tak Shing i. Charam Properties ii. This package is responsible for producing the pop-up dow for displaying and maintaining the properties of a stream. dow for displaying and maintaining the properties of a stream. tines are also provided. StreamCbject that is being updated is provided by baing_updated, which is a global symbol. It is expected to set prior to calling stream_property_dialog. sem_beb_c b sem_beb_c b sem_beb_c ch sem_beb_c ch sem_beb_c ch sem_beb_c ch sem_beb_c ch sem_beb_c ch set_init_value tial_state talint_value dialog t_value_prefix c_mandd Ken Mooller c_mandd Ken Mooller c_mandd Ken Mooller c_mande_compression		
ion: Man-Tak Shing ion: This package is responsible for producing the pop-up dow for displaying and maintaining the properties of a stream. eam_property_dialog is the main routine. Several callback sem_property_dialog is the main routine. Several callback sem_property_dialog is the main routine. Several callback stal_state_th set prior to calling stream_property_dialog. It is espected to set prior to calling stream_property_dialog. set prior to calling stream_property_dialog. set prior to calling stream_property_dialog. sem_cancel_th eam_cancel_th eam_cancel_th eam_cancel_th eam_cancel_th eam_cancel_th eam_cancel_th eam_property_dialog p.st_info eam_property_dialog t.value_prefix t.value_prefix e. Author Change mm/dd Ken Moeller Sem_main and seminary seminary mm/dd Ken Moeller Seminary mm/dd Ken Moeller Seminary ###################################		* stream_property_dlalog as an argument.
ion: This package is responsible for producing the pop-up dow for displaying and maintaining the properties of a stream. Stream. property dialog is the main routine. Several callback tines are also provided. Stream. property dialog is the main routine. Several callback tines are also provided. Stream. property dialog stream. property dialog. It is expected to set prior to calling stream. property dialog. Tall state. cb and stream. property dialog. Static: Static: Being.updated Static: Being.updated Fall. state dialog *** *** *** *** *** *** ***		·
sinclud crafth hypothese is responsible for producing the popy-up series. **Example of the properties of a stream.** **Example of the properties of a str	:	
inc. This package is responsible for producing the popyup sour official circular contents of a stream sour circular ci		And the first of t
StreamDject that is being updated is provided by sum_observations are administrated by streamDject that is being updated is provided by streamDject that is being updated is provided by streamDject that is being updated is provided by streamDject that is a global symbol. It is expected to stream_observation being conformable being updated, with is a global symbol. It is expected to stream_observation conformable being updated by stream_observation conformable by stream_observation conformable by stream_observation conformable by stream_observation conformable by stream_observation conformable by stream_observation conformable by stream_observation conformable by stream_observation conformable b		##INCLINE OF THE PROPERTY ## CALLED OF THE P
StreamDjert that is a main routine. Several callbock times are also provided. StreamDjert that is an aglobal spabol. It is expected to the callbock of the main routine. Several callbock times are also provided. StreamDjert that is an aglobal spabol. It is expected to the callbock of	* Description: into package to responsible for producing one person	ATTICLE OF THE PROPERTY OF THE
StreamDject that is being updated is provided by StreamDject that is being updated is provided by StreamDject that is being updated is provided by StreamDject that is being updated is provided by Stringlade Cap/ReamSh.) St	The state of the s	\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
StreamDiject that is angulated is provided by StreamDiject that is angulated is provided by StreamDiject that is angulated is provided by StreamDiject that is a global symbol. It's expected to StreamDiject that is a global symbol. It's expected to StreamDiject that is a global symbol. It's expected to StreamDiject that is a global symbol. It's expected to StreamDiject that is a global symbol. It's expected to StreamDiject that is a global symbol. It's expected to StreamDiject that is expected to Stream the Stream to Cambridge to Stream the Stream that	main routing.	\. \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \
StreamDhject that is being updated is provided by sinclude (Im/Inde (Im/Inde (Im/Inde (Im/Inde (Im/Inde (Im/Inde (Im/Inde Im/Inde (Im/Inde Im/Inde Im/	* Concines are area province.	######################################
Streamblyour tars is build give and any stronged by st	*	"Include Amplication
### Stacked which is a global symbol. It is sepected to #### can_lable.Dh #### can_lable.Dh ####################################	* The StreamUbject that is being updated is provided by	
##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Mistalog. ##Include CAM/Groplace.Dh.> ##	* st_being_updated, which is a global symbol. It is expected to	
### ### ### #### #####################	* be set prior to calling stream_property_dialog.	
### sinclude CAC/PunkB.D.D.P.### sinclude CAC/PunkB.D.D.D.P.### sinclude CAC/PunkB.D.D.D.P.### sinclude CAC/PunkB.D.D.D.P.### sinclude "gattophall.M." Static: Stat	*	
##Include CAM/PunkBub has fincinde CAM/PunkBub has fincinde CAM/PunkBub has fincinde CAM/PunkBub has hanced cAM/Scrollade CAM/Sc	*	
#include (Zm/PushBG) by #include (Zm/PushBG) by #include (Zm/PushBG) by #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Scrolladd.b) #include (Zm/Tort.b) #includ	•	
#include (Zin/RouColumn.h) #include (Zin/RouColumn.h) #include (Zin/Soulcolumn.h) #include (Zin/Soulcolumn.h) #include (Zin/Soulcolumn.h) #include (Zin/Soulcolumn.h) #include (Zin/RouColumn.h) #include (Zin/Roulcolumn.h) #include (Zin/Tost.h) #include (Zin/Tost.h) #include (Zin/Tost.h) #include "getoph.editor.h" #inc		
#include CAM/ScrolledWind filedued CAM/Scrolled filedued C		
#include (Am/Selector) #inclu		
### Author Change Author Street Author Stree		
#include (Am/Part.h) #include	* initial_state_cb	
#include #include CanTrate ***********************************	* stream_type_cb	
#include \(\text{XiTarkF}, \text{AD} \) #include \(\text{XiTarkF}, \text{AD} \) #include \(\text{XiTarkF}, \text{AD} \) #include \(\text{XiTarkF}, \text{AD} \) #include \(\text{XiTarkF}, \text{AD} \) #include \(\text{XiTarkF}, \text{AD} \) #include \(\text{YiTarkF}, \text{YiTarkF}, \text{YiTarkF}, \text{YITAR} \) #include \(\text{YiTarkF}, \text{YITAR} \) #include \(\text{YiTarkF}, \text{YITAR} \) #include \(\text{YiTarkF}, \text{YITAR} \) #include \(\text{YiTarkF},	* state_query_cb	
#include <tm></tm> #include %Tm/ToggleBG.h> #include "action_area.h" #include "ge_deSt_h" #include "ge_deSt_h" #include "ge_dest_h" #include "ge_dest_h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "graph_object_list.h" #include "graph_object_list.h" #include "graph_object_list.h" #include "graph_object_h" #include "	* latency_cb	
#include "action_area.h" #include "ge_defs.h" #include "ge_defs.h" #include "ge_interface.h" #include "ge_intitities.h" #include "ge_intitities.h" #include "ge_intitities.h" #include "ge_intitities.h" #include "graph_editor.h" #include "graph_editor.h" #include "stram_object.h" #include "stram_object.h" #include "stram_object.h" #include "stram_object.h" #include "varing.h" #include "varing.h" #include "varing.h" #include "varing.h" #include "stram_object.h" #include "varing.h" #in	* latency_unit_cb	#include <xm togglebg.h=""></xm>
#include "action_area.h" #include "ga_dafa.h" #include "ga_dafa.h" #include "ga_dafa.h" #include "ga_tutilities.h" #include "ga_tutilities.h" #include "gatoppahall.h" #include "graph_object.h" #include "graph_object.h" #include "graph_object.h" #include "stream_object.h" #include "arean_object.h" #include "arean_object.h" #include "warning.h" #include "warni	* stream_ok_cb	
#include "ge_defs.h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "ge_interface.h" #include "graph_object_list.h" #include "graph_object_list.h" #include "graph_object_list.h" #include "stream_object.h" #include "stream_obj	* stream cancel cb	
#include "ge_interface.h" #include "ge_interface.h" Static: Static: #include "ge_uilities.h" #include "graph_editor.h" #include "graph_object_list.h" #include "graph_object_list.h" #include "graph_object.h" #include "stream_object.h" #include "	* stream help ob	
#include "ge_utilities.h" // kbm #include "gettopshell.h" #include "gettopshell.h" #include "gestph_object_list.h" #include "gettoph_object_list.h" #include "sprian_object.h" #include "sprian_object.h" #include "sprian_object.h" #include "varian_object.h" #include	* stream brobatty dialog	
#include 'getophell.h' #include 'getophell.h' #include 'getophell.h' #include 'getophell.h' #include 'getophell.h' #include 'getophell.ist.h'' #include 'getophell.ist.h'' #include 'getion_object.h'' #include 'getion_object.h'' #include 'getion_object.h'' #include 'getion_object.h'' #include 'getion_object.h'' #include 'getion_object.h'' #include 'getion object.h''		
#include graph_editor.h" #include "graph_editor.h" #include "graph_editor.h" #include "graph_editor.h" #include "graph_editor.h" #include "spline_object.h" #include "spline_object.h" #include "spline_object.h" #include "stream_object.h"		
#include "graph_calvet.in" #include "graph_calvet.in" #include "sph_calvet.in" #include "spline_object.in" #include "spline_object.in" #include "spline_object.in" #include "spline_object.in" #include "spram_object.in" #include "spram_object.in" #include "spline_object.in" #include "spram_object.in" #include "spram_ob		
#include "graph_object_list.h" #include "spilas_object.h" #include "stream_object.h" #include "stream_object.h" #include "stream_object.h" #include "varning.h" #include "varning	* Globals/Static:	
#include "operator_object.h" #include "spline_object.h" #include "stream_object.h" #include "varning.h" #include "	*	
#include "spina_object.h" #include "stream_object.h" #include "stream_object.h" #include "varining.h" #include "varining.h" #include "varining.h" #include "varining.h" #include "varining.h" //static STREAM temp_st_info = new(ST_NODE); //static Widget initial_state; //static Widget state_init_value = NULL; //static Widget state_init_value = NULL; //static Gar *init_value_prefix = NULL; //static BODLEAN stream_latency_error; //static BODLEAN stream_latency_error; //static BodleAn stream_latency_error; //static Anthor Change StreamObject *temp_st_info; Widget initial_state;	* st_being_updated	
#include "staba_object.n" #include "varning.h" #include "varning.h" #include "varning.h" #include "varning.h" #include "varning.h" #include "varning.h" #include "varning.h" #include "varning.h" //static STREAM temp_st_info = new(ST_NODE); //static Widget state_init_value = NULL; //static Widget state_init_value = NULL; //static Widget state_init_value = NULL; //static Ghange #include Warning.h" //static Widget state_init_value = NULL; //static Ghange #include Warning.h" //static Widget state_init_value = NULL; //static Ghange #include Warning.h" //static Widget state_init_value = NULL; //static Ghange #include Warning.h" //static Widget state_init_value = NULL; //static HoolEAN stream_latency_error; //static Widget initial_state;		
#include "waning.n" #include "windows.h" #include "windows.h" //extern StreamObject *st_being_updated /* = chosen stream //static STREAM temp_st_info = new(ST_NODE); //static Widget initial_state; //static Widget state_init_value = NULL; //static Widget state_init_value = NULL; //static char *init_value_prefix = NULL; //static BOOLEAN stream_latency_exror; //static BOOLEAN stream_latency_exror; //static Boolean ** ** ** ** ** ** ** ** ** ** ** ** **	* temp_st_inio	
#include Vindows.n. te_init_value //extern StreamObject *st_being_updated /* = chosen stream //static STREAM temp_st_info = new(ST_NODE); //static Widget initial_state; //static Widget state init_value = NULL; //static Widget state init_value = NULL; //static widget state init_value = NULL; //static char *init value_prefix = NULL; //static bOOLEAN stream_latency_error; //static BOOLEAN stream_latency_error; //static Boole *temp_st_info; //dd Ken Moeller // Widget initial_state;		unduludan duning
<pre>dialog dialog //static STREAM temp_st_info = new(ST_NODE); //static Widget initial_state; //static Widget initial_state; //static Widget state init_value = NULL; //static Widget st_dialog; //static widget st_dialog; //static char *init_value_prefix = NULL; //static boolean *init_value_prefix = NULL; //static boolean *init_value_prefix = NULL; //static boolean *init_value_prefix = NULL; //static boolean *init_value_prefix = NULL; //static char *init_value_prefix = NULL; //static boolean *init_value_prefix = NULL; //static higher *init_value_prefix = NULL; //static char *init_value_prefix = NULL; //static higher *i</pre>	* initial_state	*Include "Vindows.n"
dialog // static STREAM temp_st_info = new(ST_NODE); // static Widget initial_state; // static Widget state_init_value = NULL; // static Widget state_init_value = NULL; // static char *init_value_prefix = NULL; // static char *init_value_pr	state init palue	
dialog t_value_prefix t_value_prefix	*	
//static Widget t_value_prefix //static Widget //static Widget //static Widget //static Widget //static BODLEAM mm/dd Ken Moeller StreamObject *te	* st_dimlog	//static STREAM temp_st_info = new(ST_NODE);
t_value_prefix //static Widget //static Widget //static Widget //static Widget //static Widget //static Doublet //static Videt initial_:	*	//static Widget initial_state;
//static Widget //static Widget //static char //static char //static BODLEAN mm/dd Ken Moeller StreamObject *to Widget initial_:	* init_value_prefix	//static Widget state_init_value = NULL;
//static char //static boolEan //static boolEan //static boolEan //static boolEan //static boolEan //static boolEan //static char //static ch	*	//static Widget st_dialog;
Date Author Change yy/mm/dd Ken Moeller	* History:	
Date Author Change yy/mm/dd Ken Moeller		//static BOOLEAN stream_latency_error;
yy/mm/dd Ken Moeller	Date Author	
# # MIGEOT INITHAL STATE:	yy/mm/dd	StreamUbject *temp_st_info;
	*	Widge initial_state;

```
action_items[1].data = (XtPointer)dialog; //Set cancel buttons client_data
                                                                                                                                                                                                                                                                                                                                 XtvaSetValues(state_init_value, XmNvalue, init_value_prefix, NULL);
free(init_value_prefix); init_value_prefix = NULL;
                                              if (!state_init_value) {
    state_init_value = XtVaCreateManagedWidget("state_init_value",
xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           dialog = XtVaCreatePopupShell ("dialog", xmDialogShellWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     pane = XtVaCreateWidget("pane", xmPanedWindowWidgetClass, dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ۲,
                                                                                                                                                                                                                    XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       static void initial_state_cb(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        "initial_state.hlp"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtDestroyWidget(XtParent(XtParent(W)));
                                                                                                                                                                                          XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             dialog, pane, rc, text_w, action_a;
                                                                                                                                                                                                                                                                                                          copy_str_eps(text, &init_value_prefix,19);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if ((text != NULL) && (*text != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtDestroyWidget(state_init_value);
state_init_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNtitle, "Stream Initial Value",
XmNdeleteResponse, XmDESTRUY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            text
                                                                                                                                                                                                                                                                                                                                                                                                                          else {
   if (state_init_value) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *description;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNsashHeight, 1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmString string;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KmNsashWidth,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          free(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtParent(W),
                                                                                                                                    XmNx, 150,
XmNy, 130,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NULL);
                                                                                                                                                                                                                                                 NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           warning(w, "Stream name is a keyword");
update_status("Stream name is a keyword, correct or cancel", RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static void initial_state_ok_pushed(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *)call_data;
                                                                                                                                                                                                                                                                                static void stream_name_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   update_status("Illegal stream name, correct or cancel:"
                                                                                                                                                                                                                                                                                                          XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st_info->state_initial_value(text);
                                                                                                                                                                                                                                                                                                                                                                 Widget temp_w = (Widget) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          char *text = XmTextGetString(text_u);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       warning(w, "Invalid stream name");
                                                                                                                                                                                                                                                                                                                                                                                                                                                      text = XmTextFieldGetString(temp_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget text_w = (Widget)client_data;
                                                                                                                                 BOOLEAN stream_type_error;
GraphObjectList *stDialogGraphicList;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                " id ::= letter {alpha_numeric}",
                                                 *init_value_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (is_keyword(text, false)) {
                       Widget state_init_value = NULL;
                                                                             BOOLEAN stream_latency_error;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                stream_name_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   stream_name_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                temp_st_info->name(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           stream_name_error = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_st_info->name("");
                                                                                                       BOOLEAN stream_name_error;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (!valid_id(text)) {
                                                                                                                                                                                                                       // stream property menu
                                                                                                                                                                                                                                                                                                                                                                                                char* text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 if (text != NULL)
Widget st_dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      return;
```

```
copy_str_eps(initial_str, &init_value_prefix,19);
XtVaSetValues(state_init_value, XmNvalue, init_value_prefix, NULL);
free(init_value_prefix); init_value_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNcursorPositionVisible, False,
if ((*text != '\0') && !valid_type_name(text)) {
    warning(w, "Invalid stream type name (syntax or keyword)");
    update_status("Illegal stream type name, correct or cancel:"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        state_init_value = XtVaCreateManagedWidget("state_init_value",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtVaSetValues(initial_state, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if ((initial_str != NULL) && (*initial_str != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     initial_str = temp_st_info->state_initial_value();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              static void state_query_cb(Widget, XtPointer which,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st_info->is_state_variable( (int) which);
                                                                                                      " type_name ::= id | id '[' type_decl ']'",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              if (temp_st_info->is_state_variable()) {
                                                                                                                                                                                                                                                                                                                                                                                             temp_st_info->stream_type_name(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (XmToggleButtonCallbackStruct *) cbs;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    temp_st_info->stream_type_name("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XtPointer cbs) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if (!state_init_value) {
                                                                                                                                                                                                                   stream_type_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    stream_type_error = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char* initial_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                          if (text != NULL)
                                                                                                                                                                             XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           if(state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtFree(text);
                                                                                                                                         RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         NULL);
                                                                                                                                                                                                                                                      return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNx, 150,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     X=Ny, 130,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      else {
                                                                      rc = XtVaCreateWidget("control_area", xmNowColumnWidgetClass, pane, NULL);
string = XmStringCreateSimple("View or Edit Stream Initial Value");
XtVaCreateWanagedWidget("label", xmLabelGadgetClass, rc,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     action_a = CreateActionArea(pane, action_items, XtNumber(action_items));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    //text_v = XtVaCreateManagedWidget("text-field", xmTextFieldWidgetClass,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          true); n++;
XmMULTI_LINE_EDIT); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtAddCallback(text_w, XmNmodifyVerifyCallback, validate_text, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        //XtAddCallback(text_w, XmNactivateCallback, activate_cb, action_a);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 description); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 text_w = XmCreateScrolledText(rc, "text-field", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         static void stream_type_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtSetArg(args[n], XmNcursorPositionVisible, true); n++; XtSetArg(args[n], XmNwordWrap,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             true); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    12); n++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                70); 11++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           //Set client data for the "OK" and "Cancel" buttons
                                                                                                                                                                                                                                                                                                                      description = temp_st_info->state_initial_value();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              action_items[0].data = (XtPointer)text_W;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Widget temp_w = (Widget) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtSetArg(args[n], XmNscrollHorizontal,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtSetArg(args[n], XmNscrollVertical,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      text = XmTextFieldGetString(temp_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNeditMode,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNeditable,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtSetArg(args[n], XmNcolumns,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtPopup(dialog, XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtSetArg(args[n], XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtSetArg(args[n], XmNrows,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                                                                                                                   XmNlabelString, string,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KtManageChild(text_w);
                                                                                                                                                                                                                                                      XmStringFree(string);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XtManageChild(pane);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free (description);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               char* text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           rc, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtManageChild(rc);
                                                                                                                                                                                                                                                                                                                                                                                                                             args[10];
                                                                                                                                                                                                                                                                                                                                                                                             n = 0;
```

```
static void latency_unit_cb(Widget w, XtPointer which, XtPointer cbs) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   stDialogGraphicList->propagate_stream(st_being_updated->id(), true);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          static void stream_cancel_cb(Widget w, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     static void stream_ok_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 st_being_updated = (StreamObject *) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st_info->latency_unit( (int) which );
                                                                                                                                 "", NULL);
                                                                                                                                                                                                                                                                                                                                                                                               (XmToggleButtonCallbackStruct *) cbs;
                                   Widget temp_w = (Widget) client_data;
                                                                                                                                                                                                                                                                                                                                                               XmToggleButtonCallbackStruct *state =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *st_being_updated = *temp_st_info;
                                                                                                                               XtVaSetValues(temp_w, XmNvalue,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (stream_latency_error) return;
if (stream_name_error) return;
if (stream_type_error) return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              StreamObject *st_being_updated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  st_being_updated->draw(SOLID);
                                                                                                                                                                                                  printf("latency_error_cb\n");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtDestroyWidget(XtParent(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     st_being_updated->erase();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 save_state(SAVE_REQUIRED);
                                                                                                    if (stream_latency_error)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  delete temp_st_info;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                              if(state->set)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         update_status("Illegal value for latency time (correct value or Cancel):" time ::= digit {digit}",
XtVaSetValues(initial_state, XmNsensitive, False, NULL);
if (state_init_value) {
   XtVnmanageChild(state_init_value);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          static void latency_error_cb(Widget w, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                            static void latency_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (!valid_integer_literal(text, &latency_value)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               warning(w, "Illegal value for latency time");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Display new value from latency
if (latency_value != UNDEFINED_TIME) {
    sprintf(buffer, "%d", latency_value);
    XtVaSetValues(temp_w, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                               XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                  char buffer[INPUT_LINE_SIZE];
Widget temp_w = (Widget) client_data;
char *text = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    text = XmTextFieldGetString(temp_w);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               temp_st_info->latency(latency_value,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                latency_value = UNDEFINED_TIME;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 stream_latency_error = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           stream_latency_error = true;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       stream_latency_error = false;
                                                                                                    state_init_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  temp_st_info->latency_unit());
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   if (white_space(text))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            latency_value;
                                                                                                                                                                                               free (initial_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtFree(text);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RING_BELL)
                                                                                                                                                                                                                                   return;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    return;
```

```
XtVaCreateManagedWidget(prompt, xmLabelGadgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtVaCreateManagedWidget(prompt, xmLabelGadgetClass, st_dialog,
                                                                                                            st_dialog = XmCreateBulletinBoardDialog(GetTopShell(parent),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                stream_name = XtVaCreateManagedWidget("stream_name", xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaSetValues(stream_name, XmNvalue, name_str, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     stream_type = XtVaCreateManagedWidget("stream_type",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            type_str = temp_st_info->stream_type_name();
XtVaSetValues(stream_type, XmNvalue, type_str, NULL);
XtSetArg(args[ac], XmNautoUnmanage, False); ac++;
t = XmStringCreateSimple("Stream Property");
XtSetArg(args[ac], XmNdialogTitle, t); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // create the stream type label and text field
                                                                                                                                                                                                                                                            // create the stream label & text field
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   prompt = dup_str("Is a state stream?");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         // create a state_stream query label
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           prompt = dup_str("Stream Type:");
                                                                                                                                                                                                                                                                                                                                                                           prompt = dup_str("Stream Name:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               name_str = temp_st_info->name();
                                                                                                                                          "Stream_Property", args, ac);
                                                                                                                                                                                                                                                                                                                   char* name_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 char* type_str = NULL;
                                                                                                                                                                                                    XmStringFree(t);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       free (name_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(type_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      free(prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                        XmNx, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KmNx, 150,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNy, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XENY,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KmNy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       if (st_being_updated == (StreamObject +)NULL) {
    prompt = dup_str("Bad Stream Pointer Passed To Stream Dialog");
                                                                                                                                                                                                                                                                                                                 static void stream_help_cb(Widget u, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ok_button, cancel_button, help_button;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      300);
310);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmString button1, button2, t, init_value;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          void stream_property_dialog(Widget parent,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Widget stream_name, radio_box, unit_box,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         char* prompt, buffer[INPUT_LINE_SIZE];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      *temp_st_info = *st_being_updated;
                                                                                                                                                                                                                                                                                                                                                                           help_cb(w, client_data, call_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 stDialogGraphicList = graphic_list;
temp_st_info = new StreamObject();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GraphObjectList *graphic_list) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     StreamObject *st_being_updated,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtSetArg(args[ac], XmNheight, XtSetArg(args[ac], XmNwidth,
                          XtDestroyWidget(XtParent(w));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        stream_latency_error = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = false;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            stream_type, latency,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        state_init_value = NULL;
init_value_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  warning(parent, prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         } else { // Build dialog
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         int initial_button, ac;
                                                                                  delete temp_st_info;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          stream_name_error
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        stream_type_error
                                                                                                                                          clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                clear_status();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int x, int y,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Arg args[10];
                                                                                                                                                                                                       return;
                                                                                                                                                                                                                                                                                                                                                                                                                                      return;
```

```
XtVaCreateManagedWidget("separator", xmSeparatorWidgetClass, st_dialog,
                                                                                         copy_str_eps(initial_str, &init_value_prefix,19);
XtVaSetValues(state_init_value, XmNvalue, init_value_prefix, NULL);
free(init_value_prefix); init_value_prefix = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ", args, ac);
                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtVaCreateManagedWidget(prompt, xmLabelGadgetClass, st_dialog,
                                XmNcursorPositionVisible, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  sprintf(buffer, "%d", temp_st_info->latency());
XtVaSetValues(latency, XmNvalue, buffer, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ĕ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (temp_st_info->latency() != UNDEFINED_TIME) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                unit_box = time_unit_menu(st_dialog, "unit_box",
XmNeditable, False,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_st_info->latency_unit(), latency_unit_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        latency = XtVaCreateManagedWidget("latency",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ok_button = XmCreatePushButton(st_dialog, "
                                                                                                                                                                                                                                                                                                                                                                                        // create the latency label and text field
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // create the OK, Cancel, Help buttons
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtSetArg(args[ac], XmNx, 125); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtSetArg(args[ac], XmNy, 240); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XtSetArg(args[ac], XmNr, 20); ac++;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XtSetArg(args[ac], XmNlabelString,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                            prompt = dup_str("Latency:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmStringCreateSimple("OK"));
                                                                                                                                                                                                                                                          state_init_value = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtManageChild(ok_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtManageChild(unit_box);
                                                                                                                                                                                                                                                                                                                            free(initial_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNcolumns, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNy, 220,
XmNwidth, 310,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    free (prompt);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmNx, 150,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmNy, 170,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmNy, 170
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNx, 10,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     220,170);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ac = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NOLL);
                                                                                                                                                                                                                            6156
                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          state_init_value = XtVaCreateManagedWidget("state_init_value", .
                                                                                                                                                                                                                                                                                                                                                                                                                                                            radio_box = XmVaCreateSimpleRadioBox(st_dialog, "radio_box",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = XtVaCreateManagedWidget(dup_str("State Initial Value"),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtVaSetValues(initial_state, XmNsensitive, False, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XtVaSetValues(initial_state, XmNsensitive, True, NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     // create the initial state value label and text field
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          initial_str = temp_st_info->state_initial_value();
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtAddCallback(initial_state, XmNactivateCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if ((temp_st_info->is_state_variable()) &&
(initial_str != NULL) && (*initial_str != '\0')) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          initial_button, state_query_cb,
XmvaRADIOBUTTON, button1, NULL, NULL, NULL,
XmvaRADIOBUTTON, button2, NULL, NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (temp_st_info->is_state_variable())
                                                                                                                                                                                                                                                                                           button2 = XmStringCreateSimple("Yes");
                                                                                                                                                                                                                                                                                                                            if (temp_st_info->is_state_variable())
                                                                                                                                                                                                                                                          button1 = XmStringCreateSimple("No");
                                                                                                                                                                                                                            // create radio-box for state stream
                                                              XmNalignment, XmALIGNMENT_BEGINNING,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                initial_state_cb, (XtPointer)NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 xmPushButtonGadgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        xmTextFieldWidgetClass, st_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XtManageChild(radio_box);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmNorientation, XmHORIZONTAL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   char* initial_str = NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmStringFree(button1);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(button2);
                                                                                                                                                                                                                                                                                                                                                             initial_button = 1;
                                                                                                                                                                                                                                                                                                                                                                                                                            initial_button = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     initial_state
                                                                                                                                free (prompt);
                                                                                               NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmNx, 150,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNy, 130,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmNx, 150,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmNx, 10,
```

KmNy, 130,

%tVaCreateManagedWidget(prompt, xmLabelGadgetClass, st_dialog,

```
XtAddCallback(cancel_button, XmNactivateCallback, stream_cancel_cb,
                                                                                                                                                                                                     XtAddCallback(help_button, XmNactivateCallback, stream_help_cb,
XtAddCallback(ok_button, XmNactivateCallback, stream_ok_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                          XmProcessTraversal(parent, XmTRAVERSE_CURRENT);
                                                                                                                                                                                                                                                                                                                                                                             XtPopup(GetTopShell(st_dialog), XtGrabNone);
                                                                                                                                                                                                                                          (XtPointer) "stream_property.hlp");
                                 (XtPointer) st_being_updated);
                                                                                                                                                                                                                                                                                                          XtManageChild(st_dialog);
                                                                                                                                         (XtPointer) st_dialog);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     return;
                                                                                                    cancel_button = XmCreatePushButton(st_dialog, " Cancel ", args, ac);
                                                                                                                                                                                                                                                                                                                                     XmStringCreateSimple("Cancel");
help_button = XmCreatePushButton(st_dialog, " HELP ", args, ac);
XtHanageChild(help_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       / (XtPointer)latency);
XtAddCallback(ok_button, XmNactivateCallback,
stream_name_cb, (XtPointer)stream_name);
XtAddCallback(ok_button, XmNactivateCallback, stream_type_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtAddCallback(latency, XmNlosingFocusCallback, latency_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (XtPointer)stream_type);
XtAddCallback(ok_button, XmMactivateCallback, latency_cb,
                                                                                                                                                                                                                                       XtSetArg(args[ac], XmNr, 230); ac++;
XtSetArg(args[ac], XmNy, 240); ac++;
XtSetArg(args[ac], XmNlabelString,
      XtSetArg(args[ac], XmNy, 240); ac++;
XtSetArg(args[ac], XmNlabelString,
XmStringCreateSimple("Cancel"));
                                                                                                                                  XtManageChild(cancel_button);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (XtPointer)latency);
                                                                                                                                                                                                            ac = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ::
```

void timer_tool_add_cb (Widget w, XtPointer, XtPointer); void timer_tool_del_cb (Widget w, XtPointer, XtPointer);

void timer_tool_edit_cb (Widget w, XtPointer, XtPointer);

#endif

```
// if (XmStringGetLtoR(cbs-)value, XmFONTLIST_DEFAULT_IAG, &newtert)) // @1
if (XmStringGetLtoR(cbs-)value, XmSTRING_DEFAULT_CHARSET, &newtext)) {// @1
                                                                                                                                                                                                                                          XmSelectionBoxCallbackStruct *cbs = (XmSelectionBoxCallbackStruct *)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               // 01
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (!valid_id(newtext)) {
varning(widget, "Invalid timer ID");
update_status("Illegal ID: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Widget list_w = (Widget)client_data; XmString t = XmStringCreateSimple("Enter New Timer ID");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   warning(widget, "Timer ID is a keyword");
update_status("Timer ID is a keyword, change or cancel",
                                                                                                                           void timer_tool_add_cb(Widget w, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XtSetArg(args[n], XmNautoUnmanage, false); n++;
dialog = XmCreatePromptDialog(w, "prompt", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XmListAddItemUnselected(list_w, cbs->value, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XtSetArg(args[n], XmNselectionLabelString, t); n++;
                                                                                                                                                                                                                                                                                                                                                    XmString *strlist, new_items /* [1] */; // @1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                        //check to make sure entry is not null
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (is_keyword(newtext, false)) {
                                                                                                                                                                                                                 Widget list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                   i, *pos_list, pos_cnt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         if (newtext && *newtext){
                                                                                                                                                                                                                                                                                                  *text, *newtext;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XtDestroyWidget(widget);
                                               XtDestroyWidget(widget);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      args[5];
                                                                                                                                                                                                                                                                                                                              u_bound;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmStringFree(t);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            return;
                                                                                                                                                                                                                                                                                                  char
                                                                                                                                                                                                                                                                                                                                                                                   int
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // if (XmStringGetLtoR(cbs-)value, XmFONTLIST_DEFAULT_IAG, &newtext)) // @1
if (XmStringGetLtoR(cbs-)value, XmSTRING_DEFAULT_CHARSET, &newtext)) {// @1
                                                                                                                                                                                                                                                                                                  *****************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     varning(widget, "Invalid timer ID");
update_status("Illegal ID: id ::= letter {alpha_numeric}",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     void read_timer_id(Widget widget, XtPointer client_data,
XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  verning(widget, "Timer ID is a keyword");
update_status("Timer ID is a keyword, change or cancel",
RING_BELL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmListAddItemUnselected(list_w, cbs->value, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (XmSelectionBoxCallbackStruct *)call_data;
                                                                                                                                                                                                                                        Migration from Motif 1.2 to Motif 1.1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      //check to make sure entry is not null
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (is_keyword(newtext, false)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Widget list_w = (Widget)client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmSelectionBoxCallbackStruct *cbs =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            if (!valid_id(newtext)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (newtext && *newtext){
                                                                         Lange and Anunciado
                                                                                                                                                                                                                 96/09/29 Ken Moeller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         *text, *newtext;
                                                                                                                                                                                                                                                                                                                                                                                                                                     #include "ge_utilities.h"
                                                                                                                                                                                                                                                                                                                                                                                "ge_interface.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 "graph_editor.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               <Xm/SelectioB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "action_area.h"
                                                                                                                                                                                                                                                                                                                                                                                                               "timer_tool.h"
                                                  timer_tool.C
                                                                                                          graph_editor
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #include <Xm/PushB.h>
                                                                                                                                                                                                                                                                                                                                                       #include "ge_defs.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "warning.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmString *strlist;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   punoq_n
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RING_BELL);
                                                                                                          Program:
                                                                                                                                                                                   History:
                                                                                                                                                                                                                                                                                                                                                                                   #include
                                                                                                                                                                                                                                                                                                                                                                                                               #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #include
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #include
                                                                                                                                     Remarks:
                                                                              Author:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           return;
```

XtPointer call_data) {

#ifndef WARNING_H #define WARNING_H 1

void dlg_callback(Widget, XtPointer, XtPointer);
void warning(Widget, char *s);

#endif

```
XtUnmanageChild(XmMessageBoxGetChild(dialog, XmDIALOG_OK_BUTTON));
XtUnmanageChild(XmMessageBoxGetChild(dialog, XmDIALOG_HELP_BUTTON));
                                                                                                                                                                                        dialog = XmCreateInformationDialog(widget, "notice", args, n);
XtAddCallback(dialog, XmNcancelCallback, dig_callback, NULL);
                                                  // XmString ok = XmStringCreateLocalized("UK"); // @1
XmString ok = XmStringCreateSimple("UK"); // @1
XtSetArg(ergs[n], XmNeutoUnmanage, False); n++;
XtSetArg(ergs[n], XmNcancelLabelString, ok); n++;
                                                                                                                                                                                                                                                                                                                                                     // t = XmStringCreateLocalized(string); // @1
t = XmStringCreateSimple(string); // @1
XtVaSetValues(dialog,
XmNmessageString, t,
XmNdialogStyle, XmDIALOG_FULL_APPLICATION_MODAL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmStringFree(t);
XtManageChild(dialog);
XtPopup(XtParent(dialog), XtGrabExclusive);
  int n = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NOLL);
                                                                                                                                                                                                                                                                                                                                                                                      void dlg_callback(Widget dialog, XtPointer client_data, XtPointer call_data) {
                                                                                                                                                                                                                                                                                                        History:
#1 96/09/29 Ken Moeller
#1 Migration from Motif 1.2 to Motif 1.1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void warning(Widget widget, char *string) {
                                                       warning.C
Lange and Anunciado
graph_editor
                                                                                                                                                                                                                                                                                                                                                                                                                                           XtPopdown(XtParent(dialog));
                                                                                                                                                                                                                                                                                                                                                               #include "warning.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Widget dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmString t;
Arg args[5];
                                                                                                               Program:
                                                                                                                                           Remarks:
                                                                                      Author:
```

```
void PrintResponse (Widget widget, XtPointer client_data, XtPointer call_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void validate_tert(Widget widget, XtPointer client_data, XtPointer call_data);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void response (Widget widget, XtPointer client_data, XtPointer call_data);
                                  /* Generalize the question/answer process by creating a data structure
* that has the necessary labels, questions and everything needed to
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                // Command that was requested (OK, Cancel)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        void id_list_str_eps(ID_LIST src, char **dest_ptr, int str_size);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               int AskUser(AtAppContext app, Widget parent, Quest_Script scr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  void AskPrint(XtAppContext app, Widget parent, PrintBuf *prn);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          copy_str_eps(char *src, char **dest_ptr, int str_size);
                                                                                                                                                                                                                           // question for dialog box to confirm cmd
// label for first button
// label for second button
// label for third button
// which should be the default answer
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             int units, XtCallbackProc cb_routine,
                                                                                                                                                                                                   // label for pushbutton used to invoke
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            // Name of printer
// Name of screen dump file
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget time_unit_menu(Widget parent, char *title,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Widget PostNotice(Widget widget, char *str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             enum print_opt { Snd_to_Prt, Snd_to_File };
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               *printer;
                                                                                                      * execute a command.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      answer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            int x, int y);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 *file;
                                                                                                                                                                                                                                     char *question;
                                                                                                                                                                 typedef struct {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              typedef struct {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                print_opt op;
                                                                                                                                                                                                                                                                                                                                                                                                         Quest_Script;
                                                                                                                                                                                                   char *label;
                                                                                                                                                                                                                                                                       char *btn1;
                                                                                                                                                                                                                                                                                                                                     char *btn3;
                                                                                                                                                                                                                                                                                                      char *btn2;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  } PrintBuf; .
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    #endif
                                                                                                                                                                                                                                                                                                                                                                                                         * In each case, a dialog pops up asking for verification of the action.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * This program is intended to demonstrate an advanced implementation * of the AskUser() function. This time, the function is passed the * strings to use for the OK button and the Cencel button as well as
                                                                                                restriction is hereby granted, as long as this copyright notice appears in each copy of the program source code. This program is freely distributable without licensing fees and is provided without guarantee or warrantee expressed or implied.
                                                                                                                                                                                                                                                                                                                                                                       The first creates a file (/tmp/foo) and the second removes it.
                                                                                                                                                                                                                                                                                                                                        /* ask_user.c -- the user is presented with two pushbuttons.
                           * Copyright 1994, D'Reilly & Associates, Inc. * Permission to use, copy, and modify this program without
                                                                                                                                                                                                                                  This program is -not- in the public domain.
Written by Dan Heller and Paula Ferguson.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             the button to use as the default value.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              #include <Xm/SelectioB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #include <Xm/RowColumn.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                #include "ge_utilities.h"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #include <Xm/MessageB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              // Save_indicator status
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #define NOT_MODIFIED 0
#define SAVE_REQUIRED 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               <Xm/DialogS.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #include <Xm/PushB.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            #define windows_h 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #include <malloc.h>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          #ifndef windows_h
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   0.10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  #define CANCEL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           #define BIN2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             #define BTN3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        #define BIN1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #define YES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      #define NO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       #define OK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               #include
```

```
*******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * print_opt_selection_cb() -- displays the proper prompt for the printer
/* make sure the dialog goes away before returning. Sync with server
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               void response (Widget widget, XtPointer client_data, XtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmAnyCallbackStruct *cbs = (XmAnyCallbackStruct *) call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              * question posed in AskUser(). Set the answer (client_data)
```

```
/* make sure the dialog goes away before returning. Sync with server
                            prt_dialog = XmCreatePromptDialog(parent, "Printer", NULL, 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          // do not cancel op picked
                                                                            XmNdialogStyle, XmDIALOG_FULL_APPLICATION_MODAL,
                                                                                                                                                                                  opt = XmVaCreateSimpleRadioBox(prt_dialog, "radio_box",
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XtAddCallback(prt_dialog, XmNcancelCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmDIALOG_OK_BUTTON,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtAddCallback(prt_dialog, XmNhelpCallback,
                                                                                                                                                                                                                                                                                                                                                                                                                                      XtAddCallback(prt_dialog, XmNokCallback,
                                                                                                                                                                                                                                           print_opt_selection_cb,
XmvaRADIOBUTION, opt_prt, O, NULL, NULL,
XmvaRADIOBUTION, opt_file, O, NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XtPopup(XtParent(prt_dialog), XtGrabNone);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                prn->answer = temp_PrintCmd.answer;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmNselectionLabelString, label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtAppProcessEvent(app, XtIMAll);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PrintResponse, &temp_PrintCmd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PrintResponse, &temp_PrintCmd);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    while (temp_PrintCmd.answer == 0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtPopdown(XtParent(prt_dialog));
                                                                                                                                                                                                                                                                                                                                           XmNorientation, XmHORIZONTAL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XSync(XtDisplay(prt_dialog), 0);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    prn->op = temp_PrintCmd.op;
if (prn->answer == OK) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               "print.hlp");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 prn_str,
                                                           XtVaSetValues(prt_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XtManageChild(prt_dialog);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNdefaultButtonType,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * and update the display.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_PrintCmd.answer = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtVaSetValues(prt_dialog,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmUpdateDisplay(parent);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(opt_prt);
XmStringFree(opt_file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmStringFree(prn_str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XmStringFree(opt_lbl);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmStringFree(label);
                                                                                                                                                                                                              temp_PrintCmd.op,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XtManageChild(opt);
if (!prt_dialog) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  help_cb,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XmNtextString,
                                                                                                                                                                                                                                                                                                                                                                          NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       * to enter a printer name. Returns both answer and printer in PrintCmd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * AskPrint() -- Provide the user with a printer popup with the option
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    void AskPrint(AtAppContext app, Widget parent, PrintBuf *prn)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        if (temp_PrintCmd.op == Snd_to_Prt) {
   label = XmStringCreateSimple("Printer Name:");
   prn_str = XmStringCreateSimple(temp_PrintCmd.printer);
                                                                                                                                                                                                              label = XmStringCreateSimple("Printer Name:");
prn_str = XmStringCreateSimple(temp_PrintCmd.printer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmString opt_lbl = XmStringCreateSimple("Print to:");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              label = XmStringCreateSimple("File Name:");
prn_str = XmStringCreateSimple(temp_PrintCmd.file);
                                                                                                                                                                                                                                                                                                                                                                          prn_str = XmStringCreateSimple(temp_PrintCmd.file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmString opt_prt = XmStringCreateSimple("Printer");
woid print_opt_selection_cb(Widget opt, XtPointer which,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmString opt_file = XmStringCreateSimple("File");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 temp_PrintCmd.printer = dup_str(prn->printer);
                                                                                                                                                                                                                                                                                                                                           label = XmStringCreateSimple("File Name:");
                                                                                                                                                                            if ((print_opt) which == Snd_to_Prt) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     temp_PrintCmd.op = (print_opt) which;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = dup_str("");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmNselectionLabelString, label,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = prn->op;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XtVaSetValues(prt_dialog,
                            XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmStringFree(label);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              temp_PrintCmd.file
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               static Widget opt;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XmString prn_str;
                                                                                                                         XmString prn_str;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             temp_PrintCmd.op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmString label;
                                                                                          XmString label;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmNtextString,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NULL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4
```

```
XtUnmanageChild(XmMessageBoxGetChild(dialog, XmDIALOG_DK_BUTTON));
XtUnmanageChild(XmMessageBoxGetChild(dialog, XmDIALOG_CANCEL_BUTTON));
XtUnmanageChild(XmMessageBoxGetChild(dialog, XmDIALOG_HELP_BUTTON));
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   * time_unit_menu() -- Creates a SimpleOptionMenu with the time units
                                                            dialog = XmCreateInformationDialog(widget, "notice", args, n);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      int units, XtCallbackProc cb_routine,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         menu_widget = XmVaCreateSimpleOptionMenu(parent, title,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NULL, NULL, NULL,
  XtSetArg(args[n], XmNautoUnmanage, False); n++;
                                                                                                                                                                                                                                  XmNmessageString, Xstr.,
XmNdialogStyle, XmDIALOG_FULL_APPLICATION_MODAL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Widget time_unit_menu(Widget parent, char *title,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NULL, NULL,
                                                                                                                                                                                                                                                                                                                                                        XtManageChild(dialog);
XtPopup(XtParent(dialog), XtGrabExclusive);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NULL, NULL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                microsec = XmStringCreateSimple("microsec");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = XmStringCreateSimple("hour");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NULL, NULL, units, cb_routine,
XmVaPUSHBUTTON, microsec, NULL,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = XmStringCreateSimple("sec");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = XmStringCreateSimple("min");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XmString microsec, ms, sec, min, hour;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = XmStringCreateSimple("ms");
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XmVaPUSHBUTTON, hour,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XmVaPUSHBUTTON, sec,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XmVaPUSHBUTTON, min,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XmVaPUSHBUTTON, ms,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XmStringFree(microsec);
                                                                                                                                                                                                          XtVaSetValues(dialog,
                                                                                                                                                                                                                                                                                                                             XmStringFree(Xstr);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringFree(hour);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * understood by PSDL.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XmStringFree(sec);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XmStringFree(min);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    int x, int y) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget menu_widget;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XmStringFree(ms);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KmNx, x,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KmNy, y,
                                                                                                                                                                                                                                                                                                                                                                                                                         return dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NOLL);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   return NULL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          min
                                                                                                                                                                                                                                                                                                                                                                void PrintResponse (Widget widget, XtPointer client_data, XtPointer call_data)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *******************
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           free(prn->file); prn->file = dup_str(temp_PrintCmd.file);
free(prn->printer); prn->printer = dup_str(temp_PrintCmd.printer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XmStringGetLtoR(cbs->value, XmSTRING_DEFAULT_CHARSET, &name);
                                                                                                                        = NULL;
                                                                                                                                                      temp_PrintCmd.printer = NULL;
                                                                                                                                                                                                                                                                      * PrintResponse() -- The user made some sort of response to the
                                                                                                                                                                                                                                                                                                       * question posed in AskUser(). Set the answer (client_data)
                                                                                                                     temp_PrintCmd.file
                                                                                                                                                                                                                                                                                                                                                                                                                                                  PrintBuf *PrintCmdPtr = (PrintBuf *) client_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   // only if a string was provided
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (XmSelectionBoxCallbackStruct *) call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Widget PostNotice(Widget widget, char *str) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          if (PrintCmdPtr->op == Snd_to_Prt) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            else if (cbs->reason == XmCR_CANCEL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               AmSelectionBoxCallbackStruct *cbs =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              * XmStringCreateSimple(str);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PrintCmdPtr->printer = dup_str(name);
prn->file
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PrintCmdPtr->enswer = CANCEL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PrintCmdPtr->answer = CANCEL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PrintCmdPtr->file = dup_str(name);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    if (cbs->reason == XmCR_OK) {
                                                                                                                                                free(temp_PrintCmd.printer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PrintCmdPtr->answer = OK;
                                                                                                                     free(temp_PrintCmd.file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free(PrintCmdPtr->printer);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        free (PrintCmdPtr->file);
free(prn->file);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        args[5];
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               dialog;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         n = 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XmString Xstr;
                                                                                                                                                                                                                                                                                                                                  * accordingly.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      * PostNotice()
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   else {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (str) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Widget
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Xstr
```

```
* validate_text() -- "}" is the only character not allowed in a PSDL
                                                                                                                                                                                                                                                                                                                                                                                                                        if ((idStrLen <= (str_size - curStrLen - 5)) ||
((idStrLen <= (str_size - curStrLen)) && (idPtr->next == NULL))) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       void validate_text(Widget widget, XtPointer client_data,
                                                                                                                                                                                                                                                                                                                         while ((idPtr != NULL) && (curStrLen < str_size)) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    idPtr = idPtr->next; /* set up for next loop */
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XmTextVerifyCallbackStruct *) call_data;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             copyLen = str_size - curStrLen - 3;
if (idStrLen < copyLen) copyLen = idStrLen;
strncat(dest, idPtr->id, copyLen);
                                                                                                                               if (str_size < 3) str_size = 3;
dest = (char *) malloc(str_size+1);</pre>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             idPtr = NULL; /* break out of loop */
                                                                                                                                                                                                                                                                                                                                                                                              idStrLen = strlen(idPtr->id);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XmTextVerifyCallbackStruct *cbs =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     strcat(dest, (char*) &comma);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              curStrLen = strlen(dest);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               strcat(dest, (char*) &eps);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     if (idPtr->next != NULL) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XtPointer call_data) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            streat(dest, idPtr->id);
                                dest = dup_str("");
                                                                                                                                                                                                                                                                    s src;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                *dest_ptr = dest;
if (src == NULL)
                                                                                                                                                                                                                                                                                            curStrLen = 0:
                                                                                                                                                                                             *dest = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               * text field.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  else {
                                                                                                                                                                                                                                                              idPtr
                                                                    else {
                                                                                                                                                       * verify that memory is recovered before calling.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * to the end of the string. str_size should be at least 3. * NUTE: No memory allocated to *dest_ptr will be recovered. Caller should
  * "..." added to the end of the string. str_size.should be at least 3. * NOTE: No memory allocated to *dest_ptr will be recovered. Caller should
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             <u>|</u>
                             copy_str_eps() -- Produces a copy of src which is at most str_size long. If longer than str_size, the string will be truncated and "..." added
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         * If the ID_LIST is longer than str_size, the string will be truncated and
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        * id_list_str_eps() -- Produces a copy of src which consists of each id
* from the ID_LIST, separated by commas up to the length of str_size.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                void id_list_str_eps(ID_LIST src, char **dest_ptr, int str_size) {
                                                                                                                                                                                                                        void copy_str_eps(char *src, char **dest_ptr, int str_size) {
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        * verify that memory is recovered before calling.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   idStrLen, copyLen, curStrLen;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    dest = (char *) malloc(str_size+1);
                                                                                                                                                                                                                                                                                                                                                                                                                           if (str_size < 3) str_size = 3;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  if (strlen(src)>(str_size)) {
   strncpy(dest, src, str_size-3);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         new_line = strchr(dest,'\n');
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           *(dest+str_size-2) = '.';
*(dest+str_size-1) = '.';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *(dest+str_size-3) = '.';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            *(dest+str_size) = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              strcpy(dest, src);
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *new_line = '\0';
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     *add_point;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          *dest_ptr = dest;
                                                                                                                                                                                                                                                                                                                         char *new_line;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ID_LIST idPtr;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *dest;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             if (new_line)
                                                                                                                                                                                                                                                                                                                                                          char *dest;
                                                                                                                                                                                                                                                                                            int pos;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    char
```

comma[] = ", "; eps[] = "...";

char

return menu_widget;

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This window presents all syntax and sematic warnings and errors detected by the PSDL Editor. The operator in which the error was detected is indicated under the "Current" column. The "Parent" column indicates the respective parent operator within the PSDL hierarchical operator tree.

From this window, direct access is provided to the operator in which the error was detected or to that operator's parent operator. Prior to accessing the desired operator, the associated error message must be selected. This is accomplished by depressing the left-mouse button with the cursor over the desired error message.

User options:

Close -- Removes the Error Messages popup window.

Goto Parent -- Calls up the parent operator associated with the selected error message.

Goto Current -- Calls up the operator associated with the selected error message.

Help -- This display.

Exceptions:

Unusual behavior of an operator can be flagged through the use of an exception. PSDL facilitates this through the use of the built-in abstract data type of Exception. Exceptions are identified by name. PSDL provides for the raising of an exception of a given name, detecting the presence of an exception with a given name, and determining if no exception was raised (i.e., Normal).

When an exception is raised by an operator, the exception is

transmitted on all data streams of type exception, regardless of the exception stream label, leaving the operator, subject to the stream output guard. The exception is transmitted only over local exception streams. Thus the exception is not transmitted over exception streams which are outputs of another operator. At least one exception output stream should be provided for each operator which is capable of generating an exception.

Popup Window	This window facilitates the entry of an operator's Exception User options through the use of a scrollable text sidest.	Any number of Exceptions can be specified for the selected operator.
Operator Exceptions Popup Window	This window facilitates the e	Any number of Exceptions can

Refer to the "PSDL Grammar" option under the "Help" menu bar for

"exception" id ["if" expression] [reqmts_trace]

The grammar for an Exception is as follows:

additional information.

Jser options:

Accept the text in the scrollable window and return	to the Operator Property window.	Abandon any changes made to the scrollable window and	return to the Oneretor Dronests mindos
1	-	ī	
OK		Cancel	

return to the Operator Property window.

Help -- This display.

This window facilitates the viewing, entry and modification of an identifier list. The window scrolls up and down for viewing a long lists.

Entry into the list is performed using the Add button. Move to the desired location and press the Add button. A prompt popup window will be provided for the entry of the new identifier. Select OK to accept the identifier and return to the identifier list.

An identifier is modified by selecting (highlighted) the desired identifier and pressing the Edit button. A prompt popup window will be provided similar to that used for adding an identifier. Select OK after correcting the identifier to accept the changes and return to the identifier list. If Edit is depressed without a selected identifier a notice popup window will inform you that nothing was selected to edit.

An identifier is deleted by selecting (highlighted) the desired identifier and pressing the Delete button. The selected identifier will be removed from the list. If Delete is depressed without a selected identifier, a notice popup window will inform you that nothing was selected to delete.

Note that all modifications made to the identifier list are local to the scrollable window until the user accepts the list by depressing OK to return to the parent window. Cancel can be used to abandon all modifications made to the list.

Refer to the "PSDL Grammar" option under the "Help" menu bar for the

syntax of an identifier.

User options:

OR -- Accept the list of identifiers contained in the scrollable vindow and return to the parent window.

Cancel -- Abandon any changes made to the list of identifiers and

-- Abandon any changes made to the list of identifiers an return to the parent window.

-- Provide a prompt popup window for adding an identifier to the list.

-- Remove the identifier which the user has selected

Delete

Add

(highlighted).
-- Provide a prompt popup window for editing the identifier selected (highlighted) by the user.

Help -- This display.

Prompt Popup User options:

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-- Accept the identifier and add it to the list of identifiers within the scrollable ID List window if Add was selected or replace the selected identifier within the scrollable ID List window if Edit was selected.

-- Abandon the new identifier if Add was selected or any changes made to the identifier if Edit was selected. Control is returned to the ID List popup window.

Cancel

Control is returned to the ID List popup window.

OK	Cancel	Help
This window facilitates the entry of the graph's informal design	description of the graph. All printable characters are permitted secent for 11	Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information.

Informal Design Description Popup Window

-- Accept the text in the scrollable window and return to the main window.
-- Abandon any changes made to the scrollable window and return to the main window.
-- This display.

User options:

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ON Accent the taxt in the scrollable window and return		Cancel Abandon any Changes made to the scrollable window and	Help This display.	
Stream Initial Value Popup Window	This window facilitates the entry of a state stream's initial	value expression through the use of a scrollable text widget.	inis option is only available for state streams.	Refer to the "PSDL Grammar" option under the "Help" menu bar for the syntax rules for an initial value.

User options:

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information.

User options:

OK	1	Accept 1	t eq	ext i	H C	he so	rol	lable	Accept the text in the scrollable window and return	and	retur	Ħ
		to the Operator Property window.	pera	tor P	rop	erty	win	dow.				
Cancel	1	Abandon	any	chang	8	nade	40	the	Abandon any changes made to the scrollable window and	(A 6)	nopu	ä

-- Abandon any changes made to the scrollable window and return to the Operator Property window.
-- This display.

Help

Window
Popup
ption
Descri
Design
Informal 3

This window facilitates the entry of an operator's informal design description. The informal description provides for the free-format description of the operator. All printable characters are permitted except for '}'.

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information.

User options:

-- Accept the text in the scrollable window and return to the Operator Property window.
-- Abandon any changes made to the scrollable window and return to the Operator Property window.
-- This display. Cancel ÖĶ

Help

Operator Property Popup Window

This window provides for the viewing and editing of a PSDL operator. All modifications to the operator are local to the Operator Property window until the operator is accepted by selecting UK. Changes can be abandoned by selecting Cancel.

Name: provides a text window from which the user can enter/modify the operator's name. The name must conform to the syntax of a PSDL identifier. The name must all be unique to the current data flow diagram.

Next to the operator's name is a pull down menu for selecting between an operator and a terminator. A terminator has a Maximum Execution Time (WET) of 0.

Implementation Language: provides a pull down menu from which the user may select the desired implementation language.

Trigger: provides for the specification of an operator's trigger control constraint. The syntax for a trigger is given by:

"triggered" [trigger] ["if" expression] [reqmts_trace]

where [trigger] is one of the following:

"by all" id_list "by some" id_list The first control provides for the specification of the [trigger], through the use of a pull down menu. By selecting "By Some" or "By All", a control widget is displayed for entering the Stream 11st.

Selection of the Stream List control will access an ID List popup window from which a list of stream identifiers can be specified.

A popup window can be accessed for specifying the trigger if

condition expression by selecting the "If Condition" control.

Finally, the selection of the "Required By" control access an ID List popup window from which a list of requirement identifiers can be specified.

Timing: Access a pull down menu for selecting the timing characteristics of the operator. By default the operator is "Non-Time Critical". In this state, all additional timing parameters are unavailable. By selecting "Sporadic", the user is provided with the options of Maximum Execution Time (MET), Minimum Calling Period (MCP), and Maximum Response Time (MRT). By selecting "Periodic", the user is provided with the options of MET, Period, and Finish Within.

Each of timing options can be provided with a positive integer along with a time unit, which is available from a pull down menu. The "Required By" control access an ID List popup window from which a list of requirement identifiers can be specified.

The next three controls, "Output Guards", "Exceptions", and "Timer Ops" provide for the specification of operator control constraints.

There is a horizontal line separating the next three controls. Thes controls are used to enter data into the operator's specification.

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information regarding the syntax of an operator.

User options:

OX -- Accept the operator and return to the main window.

Cancel -- Abandon any changes made to the operator and return

-- Abandon any changes made to the operator and return to the main window.

-- This display.

Help

Operators:

A PSDL operator is a state machine. A state machine contains a finite number of inputs, outputs, and state variables; each of which are represented as a data stream.

When the state machine is executed, it reads one data object from each of the input streams. The output values of the state machine depend solely upon the current values of the input objects that were read and the current value of the state variables. At most, one data object is written to each output stream.

An operator that is implemented using a PSDL supported programming language is referred to as atomic. In this case, the operator's implementation specifies the programming language as well as the another name used to implement the operator. Operators that are not atomic are composite. A composite operator is itself decomposed into a network of operators; communicating through data streams. This stablishes a parent-child relationship between operators. The decomposite operator being the parent and the operators contained in the decomposed network being the children.

Composite operators provide for a hierarchical decomposition of a prototype. At the top most level, the prototype consists of a single operator, referred to as the root operator. Children of the root operator can either be implemented as atomic operators or as composite operators. At the lowest level, all operators are implemented as atomic operators.

In support of real-time prototypes, PSDL provides both time critical

and non-time critical operators. Execution of time critical operators can be triggered either periodically or sporadically (i.e., data driven). In order for the GAPS Execution Support subsystem to obtain a schedule which executes each operator consistently with the timing constraints of the augmented data flow diagram, a bound must be placed on the execution time of the operators. This bound is referred to as the Maximum Execution Time (MET). An operator is time critical if and non-time oritical.

A time critical operator is triggered periodically if it contains a Period (P) timing constraint. Otherwise, the operator is triggered sporadically, based on the arrival of data (i.e., data driven), and must contain a data trigger control constraint.

Since a PSDL prototype represents a closed system, often it is necessary to include operators which are not considered to be part of the prototype to create the closed system. PSDL facilitates the inclusion of these external systems as terminators. Terminators are operators with an assigned MEI of zero, and thus the time required tescute the terminator is not counted against the prototype execution time. The CAPS maintains a simulated real-time clock. During the execution of a terminator, the simulated real-time clock is turned off. Terminators are represented in the PSDL Editor by a rectangular bubble within the data flow diagram. Operators with a non-zero MEI (including those operators with an undefined MEI) are represented in the PSDL Editor by a circular bubble.

This window facilitates the entry of an operator's Dutput guard constraint options through the use of a scrollable text widget.	User options:	
Any number of Unput guards can be specified for the selected operator.	ΟK	Accept the text in the scrollable window and return to the Onerator Property window
The grammar for an Output guard is as follows:	Cancel	Abandon any changes made to the scrollable window and
"output" id_list "if" expression [reqmts_trace]	Help	recum to the uperator Froperty window This display.
Refer to the "PSDL Grammar" option under the "Help" menu bar for		

additional information.

Operator Output Guard Popup Window

Printer Popup Window

This window facilitates the saving of the current data flow diagram as an output image. The image can be saved either to a printer to a file, by selecting either the Printer or the File radio button widgets. If Printer is selected, the user can provide a printer name. If no printer name is supplied, the image is printed on the standard lpr printer. The printer must be capable of accepting PostScript input.

If File is selected, the data flow diagram is saved to the file

specified by the user using the utility xwd. This command produces an X Window System Dump File formatted image. The file name must be provided.

User options:

-- Save the image to either the printer or the user specified file.
-- Return to the main window without saving the image.
-- This display. ĕ

Cancel Help

operator = "operator" id operator_spec operator_impl type_impl = "implementation" type_name {"operator" id operator_impl} "end" Optional items are enclosed in [square brackets]. Items which may appear zero or more times appear in { braces }. Terminal symbols appear in " double quotes ". Groupings appear in (parentheses). of a psdl type that appear more than once in the expanded graph. operator_impl = "implementation ada" id "end" initial_expression = type_name "." id ["(" initial_expression_list ")"] expression = type_name "." id ["(" expression_list ")"] integer suffix representing a unique id. Restrict psdl operator names to include two integer suffixes, the first representing a unique id and the second representing an instance number. The instance number is zero for all operator declarations, and is nonzero for graph vertices, to represent operations The phrase "BY REQUIREMENTS" was changed to "REQUIRED BY." type_spec = "specification" ["generic" type_decl] [type_decl]
{"operator" id operator_spec} [functionality] "end" = "specification" ["generic" type_decl] [type_decl] requts_trace = "by requirements" id_list = "operator" op_name operator_spec operator_impl {"operator" op_name operator_spec} [functionality] "end" op_id = id ["(" [id_list] "|" [id_list] ")"] 11/14/91: Change entered by Charlie Altizer. op_name = ada_op_name "_" integer_literal ada_op_name = id "_" integer_literal = "type" id type_spec type_impl Affected productions: Affected productions: New productions: = {component} psdl grammar 12/1/90 = data_type operator component data_type type_spec -- \$Header: /work/berzins/TRANSLATOR/Documentation/RCS/psdl.grammar.current, Change op_id to allow adt operations to appear in the graph. Restrict id's representing ada operator names to include an 7/25/96 Valdis Berzins Fix unique-id suffix conventions for psdl identifiers. symbolic property lists, to support a stable interface Fix the definition of letter and alphanumeric lexical classes. expression * initial_expression binary_op initial_expression Correct typos: "initial_expression" --> "expression" ada_op_name = id "_" integer_literal op_id = [id "."] op_name ["(" [id_list] "|" [id_list] ")"] Augment vertex and edge decelarations to include operator_impl = "implementation ada" ada_op_name "end" Graph nodes have unique integer suffixes, added by the psdl editor and invisible to the user. -- v 1.7 1996/08/03 18:15:56 berzins Exp berzins \$ operator_impl = "implementation ada" op_name "end" vertex = "vertex" op_id [":" time]
edge = "edge" id [":" time] op_id "->" op_id between the GE and the rest of CAPS. op_id = id ["(" [id_list] "|" [id_list] ")"] in the descendents of "expression". op_name = ada_op_name "_" integer_literal | unary_op initial_expression property = "property" id "=" expression Generalize implementation language id. letter = "a .. z" | "A .. Z" | "_"
alpha_numberic = letter | digit Affected productions: Affected productions: Affected productions: Affected productions: Affected productions: Affected productions: New productions: 9/28/94: Valdis Berzins 7/28/94: Valdis Berzins 8/14/96 Valdis Berzins 7/25/96 Valdis Berzins 2/2/95 Valdis Berzins

```
"operator" op_id
["triggered" [trigger] ["if" expression] [reqmts_trace]]
                                                                                                                                                                                                                                                                                                                                              = [id "."] op_name ["(" [id_list] "|" [id_list] ")"]
                                                                                                                                                                    = "edge" id [":" time] op_id "->" op_id {property} -- time is the latency
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = "output" id_list "if" expression [requts_trace] | "exception" id ["if" expression] [requts_trace] | timer_op id ["if" expression] [requts_trace]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ["period" time [reqmts_trace]]
["finish within" time [reqmts_trace]]
["minimum calling period" time [reqmts_trace]]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = "control constraints" constraint {constraint}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ["maximum response time" time [requts_trace]]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = initial_expression {"," initial_expression}
                                                                       = "vertex" op_id [":" time] {property}
-- time is the maximum execution time
                                                                                                                                                                                                                                                                         = "property" id "=" expression
= "graph" {vertex} {edge}
                                                                                                                                                                                                                                                                                                                                                                                                                          = "data stream" type_decl
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 {constraint_options}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | "by some" id_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = "by all" id_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = "timer" id_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | "start timer"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       initial_expression_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = "reset timer"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | "stop timer"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     control_constraints
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    constraint_options
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                initial_expression
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = "true"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               constraint
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             timer_op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           trigger
                                                                                                                                                                                                                                                                                                                                                                                                     streams
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            timers
                                                                                                                                                                                                                                                                                                                         op_id
                                                                                                                                                  edge
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = "implementation" id id "end"
| "implementation" type_name {"operator" op_name operator_impl} "end"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = data_flow_diagram [streams] [timers] [control_constraints]
                                                                                                                                                                                                                                                                  "states" type_decl "initially" initial_expression_list "exceptions" id_list
                                                                                                                                                                                                                                                                                                                                                                                              = id_list ":" type_name {"," id_list ":" type_name}
                                                = "specification" {interface} [functionality] "end"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = [keywords] [informal_desc] [formal_desc]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | "implementation" psdl_impl "end"
                                                                                                                                                                                                                                                                                                                         | "maximum execution time" time
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = "implementation" id id "end"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = "description" "{" text "}"
                                                                                                                         = attribute [reqmts_trace]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      reqmts_trace
= "required by" id_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = id
| id "[" type_dec1 "]"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = "axioms" "{" text "}"
                                                                                                                                                                                                = "generic" type_decl
| "input" type_decl
                                                                                                                                                                                                                                              "output" type_decl
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = "keywords" id_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            [informal_desc]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = id {"," id}
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                           operator_spec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   functionality
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      informal_desc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         operator_impl
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                                                                                                    interface
                                                                                                                                                                                                                                                                                                                                                                              type_decl
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         type_impl
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                                                                                                                                                                                                                                                                                                                                                                                                                                                       type_name
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             keywords
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     id_list
```

```
= integer_literal "." integer_literal
                                                                                                                                                                                                                                                                                                   = any printable character except "}"
| "(" expression ")"
| expression binary_op expression
| unary_op expression
                                                                                                                    = letter {alpha_numeric}
                                                                                                                                                                                                                                        string_literal = """ {char} """
                                                                                                                                                                                         integer_literal
= digit {digit}
                                                                                                                                                                                                                                                                                                                                                                                       "Z .. A" |
                                                                                                                                                                                                                                                                                                                                            "6 .. 0" =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 digit
                                                                                                                                                                                                                                                                                                                                                                                                                                                    = letter
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = {char}
                                                                                                                                                                                                                                                                                                                                                                                                                                      alpha_numberic
                                                                                                                                                  real_literal
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                                                             op_name
                                                                                                                                                                                                                                                                                                                               digit
                                                                                                                                                                                                                                                                                                                                                                            letter
                                                                                                                                                                                                                                                                                     char
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              text
                                                                                                      įq
                                                                  type_name "." op_name ["(" initial_expression_list ")"]
"(" initial_expression ")"
initial_expression binary_op initial_expression
unary_op initial_expression
                                                                                                                                              binary_op
= "and" | "or" | "zor"
| "<" | ">" | "=" | ">=" | "<=" | "/="
| "+" | "=" | "$" | "*" | "mod" | "rem" | "**"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     type_name "." op_name ["(" expression_list ")"]
                                                                                                                                                                                                                                                                                                                                                                                                                                   = expression {"," expression}
                                                                                                                                                                                                                         unary_op = "not" | "abs" | "+" | "+"
                                                                                                                                                                                                                                                                                     = integer_literal unit
               integer_literal
real_literal
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | "false"
| integer_literal
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          string_literal id
                                             string_literal
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       real_literal
                                                                                                                                                                                                                                                                                                                    microsec"
| ms:
| sec"
| min:
| min:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = "true"
                                                                                                                                                                                                                                                                                                                                                                                                                     expression_list
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             time
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   expression
                                                                                                                                                                                                                                                                      time
                                                                                                                                                                                                                                                                                                                  unit
```

Prototype Specification Popup Window

This window is primarily used to view the specification of a PSDL operator. In addition, there are a few constructs of the specification which can only be specified through this window. The remainder of the operator's specification is automatically generated by the background checker.

The input, output, and state list of the operator specification are provided by the background checker. The user is allowed to specify the generic and exception list as well as the maximum execution time.

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information regarding the syntax of an operator's specification.

User options:

- -- Accept the text in the scrollable window and return to the main window.
 -- Abandon any changes made to the scrollable window and return to the main window.
 -- This display. Cancel OK
- Help.

Stream Property Popup Window

This window provides for the viewing and editing of a data flow diagram stream. Both streams and state streams are supported by this popup window. All modifications to the stream are local to the Stream Property window until the stream is accepted by selecting OK. Changes can be abandoned by selecting Cancel.

Stream Name: provides a text window from which the user can enter/modify the stream's name. The name must conform to the syntax of a PSDL identifier.

Stream Type: provides a text window from which the user can enter/modify the stream's type. The name must conform to the syntax of a PSDL identifier.

State Stream: Yes specifies that the stream is a state stream. No specifies a normal stream.

Selection of state stream access the state stream initial value. Selection of the "State Initial Value" control access a scrollable text window for the specification of the initial value expression. Latency: provides for the entry of a positive integer and a timing unit, through the use of a pull down menu, for specifying the latency in the stream.

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information regarding the syntax of a stream.

User options:

-- Accept the stream and return to the main window.
-- Abandon any changes made to the stream and return to the main window.
-- This display. Cancel ÖK

Help

TABBET

Streams are used to communicate data objects of a fixed data type from a set of one or more producer operators to a set of one or more consumer operators. While the PSDL syntax and the PSDL Editor represent a stream as a link from one producer to one consumer, multiple producers and multiple consumers are supported by matching stream names (i.e., identifiers) within the stream scope.

PSDL provides two types of data streams: data flow streams and sampled streams. A data flow stream guarantees that no data object is lost or replicated. The data flow stream behaves like a first-in-first-out (FIFO) queue with a langth of one for each consumer. A sampled stream behaves like a single memory cell which contains one data object for each consumer. The most recent data value is obtained each time the stream is read. Thus, data objects may be lost if associated with a fast producer or replicated if associated with a slow producer. The type of data stream used is determined by the consuming operator's trigger control constraint. If the consuming operator contains a "triggered by all" control constraint for a set of streams, those streams are data flow streams. Otherwise, the stream is a sampled stream.

The FIFO queue length of one for a data flow stream restricts the relative execution rates between the producer and consumer operators. In order to guarantee that no data object is lost or replicated, the output rate of the producer must not exceed the execution rate of the consumer for all data flow streams. No such restriction is placed on a sampled stream.

tate Streams:

State streams provide a state machine with memory. State streams are also used to schedule data flow diagrams that would otherwise be impossible to schedule due to circular precedence constraints. A state stream is declared in the specification section of the component in which the state stream first appears in the data flow diagram.

state stream differs from a data stream in that a state stream must

include an initial value. It is the initial value of a state stream which makes it possible for a state stream to break a circular precedence constraint. A state stream is also required when connecting time critical and non-time critical operators.

Stream Consistency:

Within the hierarchical structure of PSDL, a composite operator is implemented as a data flow diagram of a PSDL component at a lower lavel. All inputs to the composite operators in the decomposed data atternal input to at least one of the operators in the decomposed data flow diagram. Likewise, all outputs of the composite operator must be utilized as an external output from at least one of the operators in the decomposed data flow diagram. A similar set of rules require that all external inputs to a decomposed data flow diagram must be inputs to the composite operator and all external outputs to a decomposed data flow diagram must be outputs from the composite operator.

External streams in a decomposed data flow diagram inherit the stream's data object type of the the composite operator. In addition, which type of stream (i.e., data flow stream or sample stream) is derived from the trigger constraint of the consuming operator. For a composite operator, as explained above, an input to a composite operator must also be an input to at least one operator in the decomposed data flow diagram. The trigger constraints of both the composite operator and those of the applicable decomposed operators are used in the derivation of the type.

Stream Data Flow Diagram Representation:

Streams are represented as directed lines within the data flow diagram, with the arrow pointing to the consumer operator. State streams are similarly represented. However, the state stream uses a bold directed line. External streams are missing either a producer or consumer operator. The missing operator is replaced with "External".

This window facilitates the entry of an operator's Timer constraint options through the use of a scrollable text widget. Any number of Timer constraints can be specified for the selected operator.

The grammar for a Timer constraint is as follows:

timer_op id ["if" expression] [reqmts_trace]

Refer to the "PSDL Grammar" option under the "Help" menu bar for

additional information.

User options:

-- Accept the text in the scrollable window and return to the Operator Property window.
-- Abandon any changes made to the scrollable window and return to the Operator Property window.
-- This display. Cancel ŏ

Help

Timers:

PSDL provides timers as predefined abstract state machines. A timer behaves similar to a stopwatch. A timer is modeled as an elapsed time value and a run switch. As long as the run switch is on, the elapsed time value is incremented. Timers have four operations: start, stop, reset, and read. Start turns on the run switch. Stop turns off the run switch and sets the elapsed time value to zero. Read returns the current value of the elapsed time.

Timers are declared in the implementation section of a composite

operator. Timers differ from operators in that they do not appear in the data flow diagram. Timer values (i.e, the result of a read operator) are accessed by referring to the timer by name within the control constraints of an operator.

A timer is visible within the component in which it is declared. If the component's data flow diagram contains a composite operator, then the timer is visible within the decomposed components.

Timers Tool Popup Window

This window facilitates the viewing, entry and modification of a list of timers. The window scrolls up and down for viewing a long list of timers. Timers must conform to the syntax of a PSDL identifier.

desired location and press the Add button. A prompt popup window will be provided for the entry of the new identifier. Select UK to Entry into the list is performed using the Add button. Move to the accept the identifier and return to the identifier list.

identifier and pressing the Edit button. A prompt popup window will OK after correcting the identifier to accept the changes and return to the identifier list. If Edit is depressed without a selected be provided similar to that used for adding an identifier. Select identifier, a notice popup window will inform you that nothing was An identifier is modified by selecting (highlighted) the desired

An identifier is deleted by selecting (highlighted) the desired identifier and pressing the Delete button. The selected identifier will be removed from the list. If Delete is depressed without a selected identifier, a notice popup window will inform you that nothing was selected to delete. Note that all modifications made to the identifier list are local to the scrollable window until the user accepts the list by depressing OK to return to the parent window. Cancel can be used to abandon all modifications made to the list.

Refer to the "PSDL Grammar" option under the "Help" menu bar for the syntax of an identifier.

User options:

-- Accept the list of identifiers contained in the scrollable window and return to the main window.

-- Abandon any changes made to the list of identifiers and

Cancel

š

return to the main window.

-- Provide a prompt popup window for adding an identifier

to the list.

Delete

Add

Edit

-- Provide a prompt popup window for editing the identifier -- Remove the identifier which the user has selected (highlighted).

selected (highlighted) by the user.

This display. Help

Prompt Popup User options:

š

identifiers within the scrollable ID List window if Add was selected or replace the selected identifier within the scrollable ID List window if Edit was selected. Control is returned to the ID List popup window. Abandon the new identifier if Add was selected or any changes made to the identifier if Edit was selected. -- Accept the identifier and add it to the list of

Control is returned to the ID List popup window.

Cancel

Operator Trigger If Condition Popup Window

This window facilitates the entry of an expression for the operator's Trigger control constraint. The syntax for the Trigger control constraint is:

"triggered" [trigger] ["if" expression] [reqmts_trace]

where trigger is defined by one of following:

"by all" id_list "by some" id_list

The "If Condition" button is used to provide the "expression" contained within the "If" term. The id_list of the trigger is specified by first selecting "by all" or "by some" in the Trigger pulldown menu. The id_list is not visible when the Trigger is "unprotected".

Use the scrollable window to specify the expression. Accept the expression by depressing the DK button and return to the Operator Property window.

Refer to the "PSDL Grammar" option under the "Help" menu bar for additional information on the syntax of an "expression".

User options:

-- Accept the text in the scrollable window and return to the Operator Property window.
-- Abandon any changes made to the scrollable window and return to the Operator Property window.
-- This display. š

Help

Cancel

rototype Types Specification Popup Window		
	OK	Accept the text in the scrollable window and retu
This window facilitates the entry of the prototype's Types.		to the main window.
	Cancel	Abandon any changes made to the scrollable window
Refer to the "PSDL Grammar" option under the "Help" menu bar for		return to the main window.
additional information regarding the syntax of a type.	Help	This display.

APPENDIX E. INSTALLATION

The PSDL Editor consists of the background checker and the graph editor.

This appendix describes the process required to compile the graph editor as well as a PSDL Editor driver, used for debugging the graph editor.

1. SOFTWARE REQUIREMENTS

Table XIX contains the software and version numbers used to generate the graph editor. The graph editor was developed on a Sun workstation.

2. COMPILING THE GRAPH EDITOR

Contained within the graph editor source code is the file Makefile, used to build the graph editor. This file is configured to be executed from the graph editor source code directory, which is a subdirectory of a PSDL Editor directory. Prior to generating the graph editor, the user should set the default directory to that which contains the graph editor source code. The graph editor can be generated by simply typing "make" at the Unix prompt. If the graph editor compiles successfully, the image edit_graph will be generated. This file will automatically be located in the parent directory. In addition, the image sde will also be generated, in the parent directory. This is the PSDL Editor driver program, used to test the graph editor in

Table XIX. Support Software

Software	Version
Operating System	SunOS Release 4.1.3
C Compiler	gcc Version 2.6.3
C++ Compiler	g++ Version 2.6.3
Windows	X11 Version 5
	Motif Version 1.1
Make	Sun Version 4.1

Table XX. Graph Editor Required Files

edit_graph	output_guard.hlp
error.hlp	print.hlp
exceptions.hlp	psdl_grammar.hlp
exceptions_list.hlp	spec_tool.hlp
id_list.hlp	stream_property.hlp
inform_tool.hlp	streams.hlp
initial_state.hlp	timer_list.hlp
op_prop_formal_desc.hlp	timers.hlp
op_prop_informal_desc.hlp	timers_tool.hlp
operator_property.hlp	trigger_if_cond.hlp
operators.hlp	types_tool.hlp

a standalone fashion.

Table XX provides a list of the graph editor files required to support the PSDL Editor. The file edit_graph is the image which executes the graph editor. The remainder of the files are help files, which are expected to be located in the directory from which the graph editor is executed.

3. X WINDOW SYSTEM CUSOMIZATION

The PSDL Editor uses Motif to build the graph editor. Consequentially, the X Window System initialization protocol used to define window parameters can be used with the PSDL Editor [Ref. 15]. These parameters can be defined in the file .Xresources-color²⁹, located in your home directory³⁰ Table XXI provides sample declarations to set the default window size for the graph editor as well as for defining the delete key to work like the backspace key.

²⁹Or in the file .Xresources-mono for non-color systems.

³⁰Since this is a "dot" file, it will not appear under the Unix "1s" command. "Dot" files can be seen by using the -a flag (e.g., "1s -a").

Table XXI. X Window System Initialization

edit_graph*geometry: =900x700

edit_graph*XmText.translations: #override\n\

<Key>osfDelete: delete-previous-character()

edit_graph*XmTextField.translations: #override\n\

<Key>osfDelete: delete-previous-character()

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